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Industrial FINISHING

Published Monthly in the Interest of Modern Production Finishing

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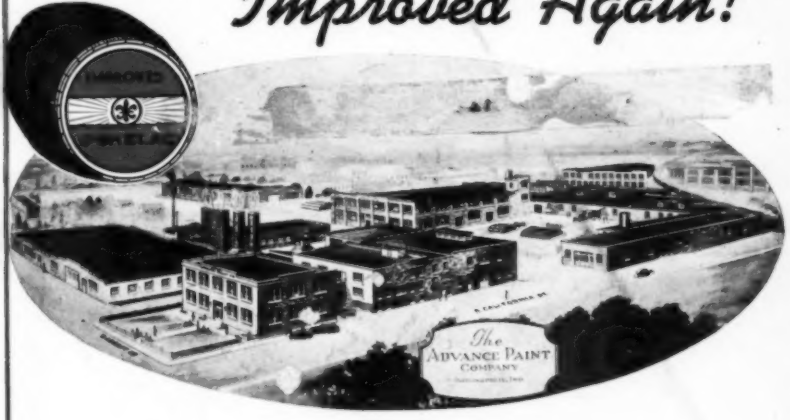
Improved Again!



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gain lives up to its name for it is now lighter in color —adaptable to present day light finishes—better build; . . . shorter drying time before sanding.

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Manufacturers of Wood & Metal Finishing Materials

INDIANAPOLIS, INDIANA

GET RID OF YOUR
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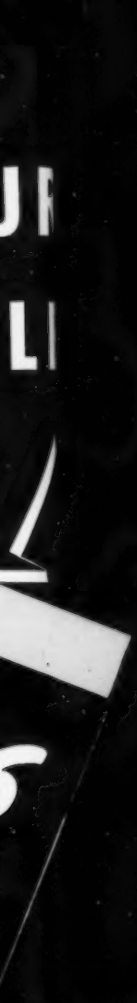
HERE'S
HOW!

GET RID OF YOUR
ACK ORDER FILL
1 Air dries to handle in a few minutes' time (No Bake Required).
2 Sets up so fast that dirt is no problem—thus dust rejections are eliminated.
3 Perfect adhesion to clean steel, aluminum, brass and die castings eliminates the need for primers.
4 It is so flexible that flat sheets may be pre-finished and later blanked and formed or drawn into shape.
5 Made in various sheens, from full gloss to dead flat, all colors—no delays for special formulations.
6 This oil-and-gasoline proof enamel may be dipped, sprayed or roller-coated.
HERE ARE 6 TIME AND SPACE SAVING WAYS BLUE KNIGHT SPEED FINISHES STEP-UP PRODUCTION



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5 Made in various sheens, from full gloss to dead flat, all colors—no delays for special formulations.
6 This oil-and-gasoline proof enamel may be dipped, sprayed or roller-coated.
Test this strip and put it away. One year from now or ten—the finish will still "take it".
ONE COAT • AIR DRIED
NO PRIMER
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This enam
how roughl
flake or chip
A finish that h
is your assuranc
shipping depart
tomers' assurance
and long service
Remember, Blue Kn
no more to use than
ples and specific da
accredited manufacture
ROXALIN FLEXIBLE LACQ
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WHERE THE FINISH COUNTS U

TWIST IT . . . BEND IT . . .
SCRATCH IT . . . BANG IT
This enamel can really take it! No matter how roughly you treat it, the finish won't flake or chip.
A finish that has such flexibility and adhesion is your assurance of trouble free assembly and shipping departments. It is also your customers' assurance of lasting new appearance and long serviceability.
Remember, Blue Knight Flexible Finishes cost more to use than ordinary lacquers. Samples and specific data gladly furnished to manufacturers.
FLEXIBLE LACQUER COMPANY, INC.
ELIZABETH, NEW JERSEY
Flexible FINISHES
FINISH COUNTS USE ROXALIN

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Are you forced to

CHANGE FINISHES

because of

Raw Material Shortages?

Then investigate immediately HILO BLACK JAPANS and ENAMELS—the old standbys of Industrial Finishers for 78 years. They are dependable and because of their formulation they will be your safest bet for CONTINUAL AVAILABILITY. There is a Japan or Enamel, air-dry or baking, for practically every purpose.

HILO

Write TODAY for Hilo Bulletin No. 1, the catalogue which describes these BLACKS and lists their uses and applications.

HILO VARNISH CORP.

49 STEWART AVENUE BROOKLYN, N. Y.

HILO VARNISH CORP.
49 Stewart Avenue, Brooklyn, N. Y.

Send me Bulletin No. 1 on Hilo Black Japans and Enamels.

Firm Name.....

Your Name.....

Address.....

ARE YOU WORRIED ABOUT SUPPLIES BEING STOPPED OR RATIONED?

IN THE FINISHING FIELD ZAPON CAN HELP

As defense activities pound at an ever higher tempo, the scarcity of many materials becomes daily more marked. In the finishing field for instance, various raw materials essential to industrial finishes are rapidly becoming harder to obtain. Costs of these materials, of course, have increased and are still increasing.

We at Zapon believe we can supply an answer to the urgent question of filling many of these gaps. Such is the wide range of Zapon finishes, so thorough has been our research in finishing materials, that we feel exceptionally well qualified to help solve these problems.

We feel certain that we can supply satisfactory finishes based on materials which are reasonably available and less likely to feel the pinch of the emergency. Such finishes will not be makeshifts hastily thrown together, but proven, widely used Zapon products. If you will tell us your finishing problem, we will go to work on it.

FOR EXAMPLE:

XE-877, a pigmented lacquer enamel, developed last year, is but one example of how we have been able to substitute acceptable materials for materials hitherto used which are now hard to obtain or which have gone up in price.

XE-877 is especially suited for use on wood, composition, bisque, pottery and the like. This grade has extremely high solids, very high gloss, excellent hiding power, and dries rapidly to a full hard surface. XE-877 comes in black, white and a range of colors. A number of companies are using this grade to their own definite advantage.

ZAPON

ZAPON DIVISION · ATLAS POWDER COMPANY

Eastern Sales: Stamford, Conn. *Western Sales:* North Chicago, Ill.

INDUSTRIAL FINISHES

Seventeenth Year of Publication

Industrial FINISHING

Reg. U. S. Pat. Office

Published Monthly in the Interest of Modern Production Finishing

Vol. XVII, No. 8 | JUNE, 1941 | $2.00 a Year

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Published by

Practical Publications, Inc., 222 E. Ohio St., Indianapolis, Ind.

Eastern Representative: C. A. Larson, 254 West 31st Street, New York City; Phone Penna. 6-9049

Letters from Readers...

OF INDUSTRIAL FINISHING

These letters (and many others) were answered recently by the editorial department, but are published here to reveal certain interesting trends of desire and activity in the industry, and to encourage additional inquiries, comments and suggestions. Further information about any of them can be obtained by writing this office.—Editor.

Cabinet Hardware

Can you direct me to a firm that handles cabinet hardware? I have looked in all of the hardware catalogs in town and so far have been unable to find what I want. I would appreciate it if you would refer me to some firm or firms that could supply me with the type I need. I would purchase them in dozen lots, of course. —E. B. N.

We are sending you the names and addresses of several manufacturers of cabinet hardware.—ED.

Weathering Finish for Hardware

In our product we use a considerable amount of galvanized hardware that must withstand severe weather conditions. Bolts especially must be protected, as the threads are exposed and they must be in usable condition at all times over a period of years.

With the increasing difficulty of obtaining certain materials, it seems desirable to look for possible substitutes. Perhaps you can tell me if there is available a lacquer or some synthetic finish that might be applied to this hardware as a substitute for galvanizing.

This finish should be tough and resistant to extreme weather conditions. When used on bolt threads, it should withstand occasional use without damage.

Should you know of any product that might meet our requirements or be able to give us any information concerning this matter, I shall appreciate hearing from you.—M. L. Co.

We are sending you the names and addresses of several companies that manufacture and sell rust-proof coatings which may meet your requirements.—ED.

Crack Filler Wanted

We are interested in obtaining the names of some firms that make crack filler. We want to use this for filling in the joints of wood. If possible we would like a filler that will take a stain and will not crack afterward. We have tried various types but some have a glue in them which prevents the stain from going into the wood. Also, we would like a filler that does not require a 24-hour drying period.—C. J. Co. (Articles of Devotion).

Names of firms supplied.—ED.

Portable Block Sander

We desire to recommend, to certain of our customers, a reciprocating type sanding machine for use with No. 320 wet-or-dry paper and soapy water. The purpose is to sand to a glass-smooth finish a thick coat of primer surfacer on a fairly rough base of metal or wood. At present the labor involved is considerable.

The surface coated is not all flat. It has many bends and double curves but not very steep ones. There will have to be some hand sanding, prob-

"RESIST-ALL" *will . . .*

Resist all types of abuse. Positively **guaranteed** to withstand straight alcohol, liquors, fruit juices, boiling water, dilute acids, etc.

RESIST-ALL is **NOT** a lacquer, nor a varnish but it gives lacquer speed and toughness together with varnish body.

Order five gallons **today**—Satisfaction **Guaranteed.**

****

V. J. DOLAN & CO., INC.

Manufacturers of "Unquestionable Quality" Industrial Finishes

1830-32 NORTH LARAMIE AVENUE CHICAGO, ILLINOIS

ably, but we hope to find a machine to do most of the work.

Are you able to recommend such a machine? We would very much appreciate any help you can give us in this matter.—T. I.

We have in mind two portable reciprocating-block sanding machines, one driven electrically and one driven by compressed air. We are sending you the names and addresses of the manufacturers.—ED.

Spray Gun Service

We wonder if you can help us out. At the present time, we are using ..... guns, which use approximately 14-cu.ft. of air per minute. We are interested in reducing this to about 8-cu.ft., without decreasing production. Can you tell us of anybody who specializes in these matters?—N. C. Co. (Furn. Mfr.)

We recommend that you take up this matter with the manufacturer of your spray guns. This company has a large organization which includes laboratories and engineering service, and we feel sure that they can take care of your problem satisfactorily.—ED.

Porcelain Enameling

We would appreciate all available information on equipment and necessary materials for porcelain enameling; also names of manufacturers of the above. Have you any data on the cost of porcelain finishes as compared with baked enameling? — D. S. Co. (World's Finest Gas Heaters).

We suggest you communicate with Ferro Enamel Corp., Cleveland, Ohio. —ED.

Burn-In Knives

We would appreciate your furnishing us with the name of a manufacturer of electric burning-in knives, to be used with shellac sticks.—A. Woodcraft Co.

Information supplied.—ED.

Thinner Article O. K.

We have just read the April, 1941 issue of INDUSTRIAL FINISHING and are very much interested in the article "Are Cheap Thinners Worth While?" on pages 24-29.

We would like to know if you have

reprints of this article on hand and, if so, what you would charge to supply us with 700 copies?

In the event reprints are not available, may we have your premission to reprint the article in our monthly house organ . . . ?—Y. Z. Co.

Glad you liked the article. We have no reprints, as we make none unless same are ordered. You may reprint the article, giving I. F. credit, in the usual manner.—ED.

Process Paints; Canvas Finishes

We have two problems on which we seek information. First, we would like the names of all manufacturers of screen-process paints. We find it difficult to obtain a good usable range of colors.

Second, we have the problem of coating a canvas with a transparent or clear material that will render it reasonably waterproof and impervious to food stains. The canvas should be coated so that it can be washed with mild soap and water, and so that a puddle of liquid standing in it for any length of time would not leave it mis-shapen when dry. Furthermore, the coating has to be reasonably inexpensive; that is, not more expensive than lacquer.

In your January Review issue we notice coatings for paper, leather, textiles, etc. Some of these products would probably apply to our situation. It is a small production matter. We have been brushing lacquer on the canvas. We are now considering having them roller coated, as it is getting too big for us. Could you also suggest the sort of organization that would do this sort of coating—100 yds. of 18-in. material?

I hope that I have given you adequate information so that you will be able to direct us to sources of material that will fill our needs.—L. O. L.

We are sending you the names and addresses of companies who have products which we think will suit your requirements.—ED.

Wood Graining

In your magazine, INDUSTRIAL FINISHING, for April, 1940 you have an article on page 12 referring to graining and etched metal plates by Mr. Jake Snyder.

Would you kindly give us a list of all the manufacturers in the United States who make these metal etched plates suitable for furniture work? If you do not have this information, would you kindly give us the address

— UNIPRIM —
ON WOOD — METAL — COMPOSITIONS!

for Lacquers and Synthetics . . .

- **One coat provides excellent coverage—has extraordinary leveling and hiding properties—can be knifed or sprayed on—dries fast and sands easily.**
- **Supports topcoat (lacquer or synthetic) unusually well—has excellent adhesion and flexibility on metal, wood or composition products.**
- **Use Uniprim Primer for dependable performance at low cost.**

Further information and samples sent on request.

LACQUERS
THINNERS
ENAMELS
METALIZED FINISHES
SYNTHETICS

UNITED LACQUER MFG. CORP.
General Offices and Factory: Linden, New Jersey

of the firm which Mr. Snyder represents, and we will write him direct and see if we can get this information from him?

We are very much interested in this process, and we would like to get all the information possible about same. —F. F. Co.

I understand you have a system of graining different woods. I am a furniture designer and do work in Grand Rapids and go all over the United States and Canada seeking designs for furniture pieces.

My Canadian firms, because of bans, are having trouble getting veneers, so have asked me to get hold of a graining process for them.

What is your process? Please send me samples of work and all data as to cost, etc. . . . —C. G. J.

We are sending you names and addresses of firms that manufacture and supply modern wood-graining equipment.—ED.

Graining Paper; Decals

We are trying to locate all types of wood papers, as well as decalcomania wood transfers. If you know of any firms that might have some of these items on hand, we would appreciate it very much if you will kindly give us their names, so that we may contact them.—E. N. Co. (Moving Pictures).

Paper-Backed Veneer

We are in need of thin veneering to be used in the manufacture of small cabinets and wood novelties, and would appreciate being put in touch with manufacturers of a thin paper-backed wood, a printed wood replica or plastic sheets. Do you know of any other material that may be used for the above purpose? We are in immediate need for some of these products and would appreciate the quickest possible means of obtaining same.—F. Furn. Co.

We are submitting some names to whom you might write.—ED.

Foto Grain Finishes

On page 44 of January 1941 issue of INDUSTRIAL FINISHING, you show a paragraph on Foto Grain Finishes—"Improved photographic wood reproductions for furniture. Multiple figure designs, including marquetry, may be applied in one quick operation over the ground coat"—reference 169.

Our shop people would be interested in obtaining additional information on

FORM - A - ROC

We offer to all industries equipped for baking finishes this highly perfected, heat-converting, synthetic enamel.

FORM - A - ROC

We have combined to an optimum degree the necessary qualities of tremendous hardness, great adhesion, smooth lustrous gloss, and freedom from haze, discoloration and wrinkling.

FORM - A - ROC

Baking schedule is of great flexibility, permitting from 5 - 50 minutes at 250 - 375° F.

FORM - A - ROC

No matter which of the present worthy finishes of this type you may be using or planning to use we sincerely recommend that you investigate

FORM - A - ROC

MADE BY

THE VARNISH PRODUCTS CO.

5208 Harvard Avenue

CLEVELAND, O.

WALKER'S MODERN PRODUCTION FINISHES

Years of laboratory research have developed Walker's outstanding line of Modern Production Finishes. Every product has been tried and proven under the exacting conditions of production use. We list them here for your consideration.

- **Chromate Primers**
- **Fillers, Surfacers and Undercoaters**
- **Synthetic Enamels to fit any production schedule. Air dry or short bake.**
- **Chlorinated Rubber Enamels**
- **Lacquers for every purpose**
- **Wrinkle Finishes and a large variety of other decorative, protective and specialty finishes.**

Walker's Modern Production Finishes may offer an immediate solution to your present finishing problem. A wire, letter or phone call will receive prompt attention. Remember to "Call on Walker."

H. V. WALKER CO.

MODERN PRODUCTION FINISHES

Elizabeth, New Jersey

the Foto Grain Finishes referred to in this paragraph and, if consistent, I shall thank you to forward this information to me as promptly as possible. —N. & W. Ry.

A product of Sherwin-Williams Co. —ED.

Film Thickness Gage

I am interested in getting information on an inductive thickness gage of the type used for measuring the thickness of enamel on iron. The instrument I have in mind uses a millimeter calibrated to read thickness of the material on the iron. If this description is clear enough to identify the instrument I am interested in, please send me the names of manufacturers.—U. Co. (Batteries).

We are sending you the names of two concerns, one or both of which may have just what you want.—ED.

Striping Tools

We would appreciate being advised of manufacturers of "striping apparatus". In particular we wish to paint a band around a sphere.—X. Corp.

We are submitting names and addresses of several manufacturers of mechanical striping tools.—ED.

Bakelite Varnish

Will you kindly advise us where we can buy Bakelite varnish and finishing materials?—N. C. Co. (Nursery Furniture).

We refer you to the Bakelite Corp., 30 E. 42nd St., New York, N. Y.—ED.

Aircraft Finishes for Australia

We desire to obtain information connected with aircraft finishing. At the present time in Australia, with the large development taking place in aircraft manufacture and maintenance, due to war conditions, there are many opportunities for men with a knowledge of finishing in this particular line.

We have tried to obtain information here but with no success, as our publications do not touch on this subject. Having studied your publication back as far as 1929-30, we note that a number of American manufacturers have printed booklets containing information covering the subject under discussion.

(Continued on page 38)

KNOWING IS BETTER THAN GUESS-WORK

87%

IS SEEING!

APPEARANCE

is by far the greatest factor in the sale . . .
Let us *standardize* a finish for you that will
pay profits. Ask us now.

LACQUERS
SEALERS
STAINS
ENAMELS
FILLERS

STILLE-YOUNG

MANUFACTURERS
CHICAGO

The finish that does a BIG job . . .

It's not only the "big guys" who take punishment. Small wares like baseball bats and toys, display racks and lawn-mower handles, novelties and giftware, get plenty of knocking around. They need a finish that'll give them powerful protection, that'll keep them goodlooking under the toughest treatment...They need *shellac.*

Strength... Beauty... Endurance

When you use shellac as a finish, you don't get merely one of the qualities your product needs, you get *every single advantage* a finish can possibly give you.

You get *ease of application,* Shellac dries quickly, bonds perfectly with the wood, or forms a super-shield on metal.

You get a *clear, transparent finish.*

You get a *beautiful surface* that helps make your product more attractive.

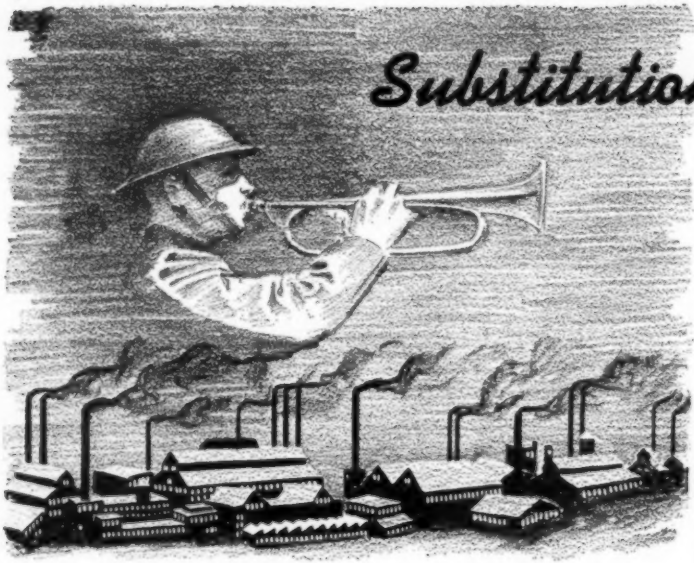
You get a *strong surface* that offers real resistance to careless handling.

You get an *enduring finish* that keeps your product in use for years afterward.

No matter what you have to finish, there's a way that *shellac* can do it more easily, more economically, more effectively. Look into shellac, and watch your sales look up!

For specific information regarding your particular finishing problem, write to:

SHELLAC INFORMATION BUREAU
65 Pine Street • New York City



THE United States of America in which we live and work, have, through their united efforts for many years, formed what is today one of the wealthiest, most endeavoring and most self sufficient nations on the face of the earth. Throughout these many years we have been accustomed to a profusion of comforts, supplies and an unending availability of raw materials the like of which has never been known in any other part of the world. It is only natural, therefore, that we have gotten into the habit of taking this wealth of supply and its subsequent production of luxury items as a matter of course, without stopping to realize that we are not as self sufficient as our scale of living might indicate.

To shock ourselves out of this state of mental lethargy and smug self satisfaction, we have merely to reflect upon what would happen if we could no longer import from our South American neighbor, Brazil. Such a restriction would involve directly, immediately and unhappily, about 95% of our entire population through its complete loss of coffee. Such an occurence would be catastrophic but not vital.

There are, however, other materials which are actually vital and indispensible to our industries. While some of them are obtainable only as imports which may be cut off entirely, the remainder of these are, or will be subject to use and distribution by priority to our defense efforts. Among these raw materials are the metals which have, in the past, been used extensively for decorative and other non-essential purposes. These include copper, nickel, chromium, tin, aluminum, magnesium and stainless steel. The shortage of some of

Finishes We May Turn To

AS A RESULT OF OUR DEFENSE PROGRAM

BY PAUL WALLACE

A discussion of various types of organic coatings which are rapidly becoming of increasing importance in assuming the place of strategic metals for new decorative effects.

★ ★ ★

these metals has already been felt in some industries which are not considered essential to our national defense program.

It is the purpose of this article to suggest how these so-called non-essential but nevertheless valuable industries may prepare to cope with the possible loss of these metals for decorative use.

Fortunately the organic coating industries have always been concerned with two primary requirements for their finishing products, first of which is that of surface protection — followed closely by their decorative value. Through this desirable combination of properties, paint manufacturers are ready to step into the picture not only through their previous experience in decorative effects, but also through their preparation, particularly by the most progressive of these, for precisely such a contingency as that which now confronts us. Their products, both new and old, are varied to such an extent that practically any desired effect can be accomplished in a manner both economical and efficient.

Bronzing Lacquers are Quick and Inexpensive

Bronzing lacquers are one of the most direct and effective substitutes for metal surfaces. They are generally inexpensive, are easy to apply, and may be applied over any reasonably smooth surface to transform the appearance of a cheap base construction to approximate closely that of the more expensive metal products. They are available in a wide range of colors and can duplicate, to an astounding degree of similarity, such metals as copper, gold, aluminum and brass of almost any shade. These finishes, with the exception of aluminum, are usually purchased in 2-compartment cans, one compartment containing the metallic powder and the other the vehicle with which it is to be mixed immediately before use.

A rather new development, but one which is not available everywhere nor in every possible color, *is that of* ready mixed copper or *brass type bronzing lacquers* which will neither settle hard nor become "green" in the can. Such products eliminate the careful mixing of metallic pigments which is usually necessary, and require only the usual proper reduction with thinners before they are used. Finishes of this type are used extensively for coating lamp stands, lamp bases, lamp reflector housings, curtain rods, drapery hangers, book

ends and the like. A splendid decorative effect is obtained when these metallic powders are combined with either pigments or dyes in the same lacquer vehicle. Such lacquers are generally known as statuary bronze finishes and they produce coatings of the type and appearance which the name suggests.

Metallic Bake Synthetics and Varnishes

Similar in type to bronzing lacquers are those metallic finishes that employ quick-drying synthetics or quick-drying short-oil varnishes as the vehicle. They differ from the lacquers in but two respects. First, unless these finishes are of the baking or force-drying kind, they require longer drying periods. Many of them, however, will dry to pack and ship in four hours.

The second and probably greatest noticeable difference is that these synthetic and varnish vehicles allow the metallic pigments to "leaf" better at the surface of the film. This improvement in "floating" and "leafing" invariably produces surfaces that are practically equivalent in appearance to the solid, polished metal itself, since these countless tiny flakes of metal join and overlap at the surface to form a continuous film of metal having a high reflectivity.

In covering fully the entire scope of metallic organic coatings, it is necessary to mention and describe a third type of material, which, although it has numerous disadvantages, must be considered because of the strikingly beautiful results it can produce. This is the buffing method for metallic effects. To produce this type of finish, a fast-setting synthetic or varnish is used. It is necessary that the vehicle "set" quickly by evaporation of solvent to a fairly firm film which will retain a slightly tacky surface condition for quite some time before it dries completely and thoroughly.

Dry Metallic Flakes Buffed on Tacky Vehicle

A uniform coat of the vehicle is first sprayed on the surface to be finished and allowed to dry to "set". Then a film of finely divided metal powder is dusted by hand over the entire surface. The powder is then "buffed", also by hand, into the surface of the vehicle film by means of a soft dry cloth to which extremely light pressure is applied. The "buffing" operation flattens and "leafs" the powder particles into perfect alignment on the surface, to which they adhere firmly because of its tacky condition. After the piece is entirely covered, the excess powder is easily whisked or blown away.

When the job is finally completed you have one of the most beautiful and highly polished metallic surfaces that is possible to obtain through the use of organic finishes. In appearance it is practically the equivalent of a plated and highly polished piece of sheet metal—possibly because there is no coating over the outside surface of the decorative metal.

Paint and varnish manufacturers have been reluctant to promote this latter type of finish for the general finishing market for a number of very well founded reasons. In the first place, it is a finish over the application of which the manufacturer has little control. It is decidedly a type of finish to be applied only by the most skillful craftsmen and artisans. The binder film has to be dried just so long and no longer before the powder is applied. The powder itself has

to be "buffed" with exactly the right stroke and touch. Too light a touch may leave a streaky appearance. Too much pressure may "burn" the film by disturbing the binder undercoat.

For these several reasons, the manufacturer of the finish can hardly guarantee results. In addition, the process is dusty and messy. Also, because exact timing and the exact types of buffing strokes are essential, this finish is far more adaptable to small surfaces and length pieces rather than to large surface areas. For this reason, it cannot be used universally, although it offers an ideal method for finishing highly polished pieces such as trim and decorative strips which are ordinarily plated and machine buffed. Vacuum cleaner trim bands, picture frame molding, and furniture beading and banding are but a few of its possible applications.

Transparent Colored Lacquers Over Lighter Colored Metal

A fourth type of metallic finish is obtainable, not by applying metal powders in or to a vehicle, but by changing the polished surface appearance of a cheap and readily available base metal so that it resembles a more expensive and less easily obtained metal. This is done by spraying or dipping transparent colored lacquers or varnishes over the surface to be transformed. Naturally, the color of the base metal must be lighter than that of the metal which it is desired to imitate.

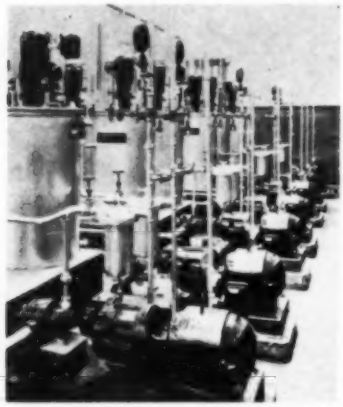
In the past, die casting alloys of zinc, aluminum and magnesium content have been highly favored for this use because of their easy molding and shaping properties, and because of their silvery white color which allows a wide number of color transformations. Such metals are now difficult or even impossible to obtain, but fortunately there are a number of lead alloys that can replace them quickly and inexpensively.

These alloys can be coated to imitate any number of shades of brass and gold. Similarly, brass or copper can be coated to imitate gold. These practices are not new, having been used extensively for such applications as costume jewelry, compact and cigarette lighters, flashlight cases, metal-toy stampings, lingerie clasps, slide-fastener fittings, clock cases, cheap pen and pencil fittings and possibly everything short of counterfeit coinage.

Hammered Metallic Finishes are Particularly Effective

The hammered type of finish is one that is easily applied and it is strikingly beautiful. In appearance it represents a sheet of metal, either uncoated or enameled, which has been embossed by repeated blows of a ball-end hammer. It is an unusually versatile finish and can be obtained in practically any metal or enamel color—in vehicles which will air dry, bake or short high-bake to form hard, durable and even exposure-resistant surfaces. One of the easiest types of novelty finishes to apply, it generally results in finished work of excellent uniformity.

At least four methods of application, for this type of finish, are known; and each individual material will carry specific instructions for its use according to one of these methods. First and probably least used is that method whereby a single coat of the hammer finish is sprayed with a regular spray gun at normal spraying pressure. The material automatically spatters from this spray gun and the combined metallic pigment floats to



Here are all mixing and supply tanks, pumps, filters and accessories in the supply room of a very complete paint-circulating system. Photograph courtesy Binks Mfg. Co.

produce the desired hammered effect. I have heard of some users mentioning that they had difficulty in obtaining the same degree of spatter and float from batch to batch of material, or even from day to day with the same batch of material.

The second method is to spray a single coat of the hammer finish with a gun equipped with a spatter nozzle. This produces a reasonably good effect with a minimum amount of labor and equipment.

The 2-Coat Method

For the most desirable effects, a 2-coat application is conceded to be the best practice. A normal spray coat of hammer finish is first applied with an ordinary spray gun. Then the hammered effect is obtained by following, within two or three minutes, with a second application by means of a gun equipped with a spatter nozzle. This second application further defines the classification of hammered finishes into methods three and four, depending upon whether this spatter coat is one of the same material used for the base coating, or whether it is one of special hammer-producing solvent.

At any rate, this second spatter application is generally sprayed at pressures of from 10 to 15-lbs. at the gun. These universally popular finishes may be applied as brilliant and colorful novelty finishes to ash trays, radios, lamp shades and the like, or may be used in the more stately and reserved combinations for heater and stove jackets, elevator doors, office partitions and burial caskets. Their excellent durability and resistance to wear make these harmonious finishes ideal for use on interior automotive fittings such as instrument panels and window trim, particularly for installation in the increasingly popular "color styled" cars.

(To be continued)

"More Than Meets The Eye"; New Brochure Free

Of interest to printers, lithographers, advertisers, packagers, manufacturers of metal products, and textile companies, is a new brochure called, "More Than Meets The Eye," which describes recent advances in the field of decorative and protective coatings.

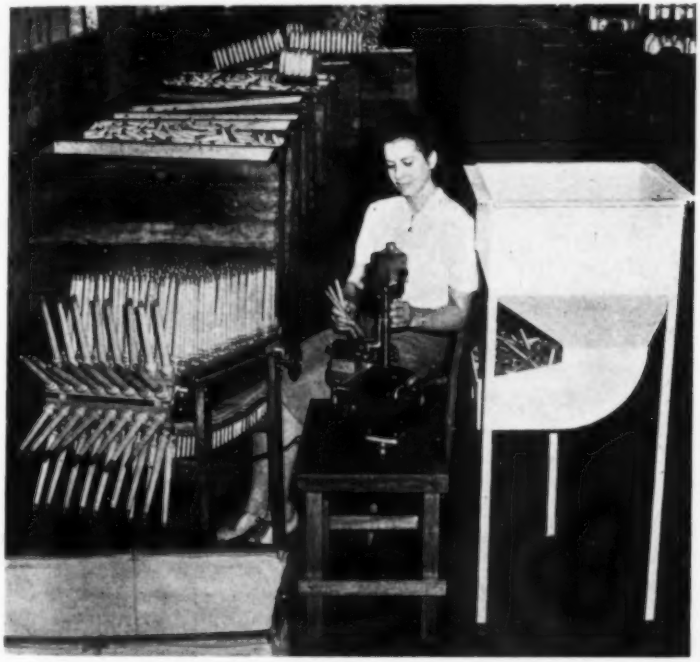
The chemical coatings discussed in "More Than Meets The Eye" include printing and lithographing inks, gravure inks, industrial finishes, metal decorating materials, textile colors, pigments and raw materials, coated fabrics, and various office and artist's supplies.

It is pointed out that in many cases, these coatings are related in character. Thus fundamental research directed to problems involving one type of coating, such as printing inks, may very well have application to the problems involving other types of coatings, such as textile colors and industrial finishes. How this research has produced improved materials which make possible faster production and improve the appearance and durability of many kinds of products is covered in a picture story.

The widespread use of chemical coatings in connection with everyday living is stressed in the brochure. There are seven large color pages indicating a few of the thousands of articles we see daily which are dependent on chemical coatings for their utility or beauty. Examples are printed newspapers, books, magazines, printed containers and wrappers, decorated cans, dress goods, shirts, electric appliances, stoves, washing machines, and office supplies like carbon paper and typewriter ribbons.

A special appeal is made to manufacturers who are dissatisfied with the production speed they are obtaining at present or with the appearance or durability of their products. It is suggested that research has produced new methods and new materials which contribute materially to attaining these advantages.

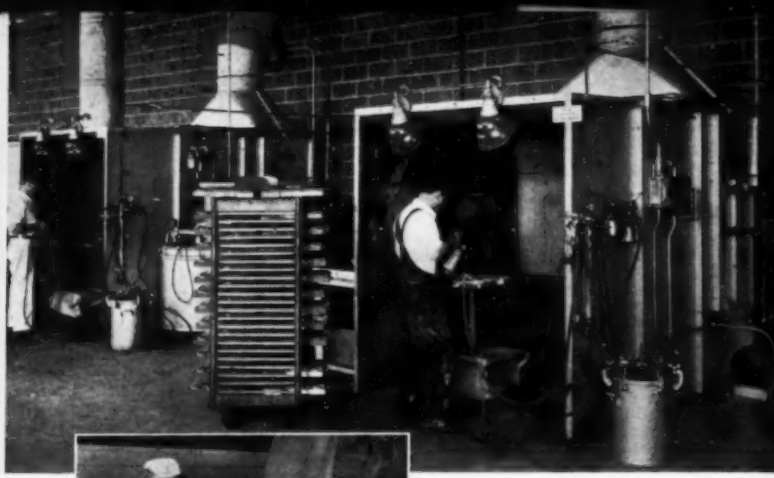
Copies of "More Than Meets The Eye" may be obtained by writing to Interchemical Corp., 75 Varick St., New York, N. Y.

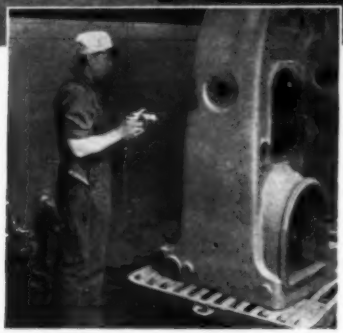


At the recent Southern Textile Exposition, demonstrations were made by means of a newly invented machine which, for the first time, makes it possible to apply bobbin enamels automatically. The machine, invented by D. A. Jolley, is shown above.

Paint engineers have developed new enamels especially for use with the new Jolley machine. With the new device about 12,000 bobbins can be tipped every eight hours with one pint of enamel, a marked improvement over the tedious hand method of the past.

Bobbins are placed on the proper-size spindle by the operator and the coating is automatically applied from the can shown on top. Then the bobbins are placed on spindles on the rotating rack at the left, and by the time they reach the farther end they are dry to handle, and drop automatically into the bin. (Photo, courtesy Sherwin-Williams Co.)





Equipment for

BY NORBERT F. SCHROEDER
Finishing Foreman

Photographs supplied through courtesy of The DeVilbiss Co.

The large view (across top of this page) shows one workman spraying with a cup gun. Cup guns and pressure material containers are available at both of these booths.

The lower picture shows a workman spraying heavy machinery, using material from a typical pressure container. Here the air suction is down through open floor grating.

Illustration on the opposite page shows a conveyorized work line where sprayers are supplied by paint-circulating system.

THE "cry" today is for tools to do the job. Too many of us in industry think of tools as dies, jigs, fixtures, double-action presses, new automatic welders, high-speed grinders, drills, etc. We overlook the man at the end of the line—the finisher. The finisher—the operator who must give the articles their surface protection, decoration and eye-appeal—is too often permitted to "go on his own".

Except for large automobile and refrigerator finishing rooms we find the majority of paint shops poorly tooled. With new developments in spray room equipment, it is surprising to note the "horse and buggy" equipment found in otherwise modern and efficient factories.

Probably there are several reasons for poorly equipped finishing rooms. . . . The equipment manufacturer's representative is often referred to the shop foreman (for

...for Expert Spray Work

small items at any rate) and upon the foreman's recommendation to management, new equipment is bought or rejected.

The shop foreman may be satisfied with the results he is getting or, if results are not entirely satisfactory, he may be more inclined to lay the blame or failure to the material rather than on the equipment. Also, he is "nearly always tied up with immediate production problems and just cannot break in and upset a job to try out a new gun, etc."

Another condition hindering the proper presentation of new equipment is the fact that spray guns, pressure tanks, air transformers, etc., cannot be left in plants as samples to be tried when someone has time.

Another reason for some of our poorly equipped finishing rooms is the finishing foreman and his attitude. For some unknown reason, certain finishing foremen have secret ways of doing things; and any attempt to introduce new methods, new procedures or new equipment is just infringing on their ingenuity. Foremen have been known to write their so-called formulas and processes in another language to prevent any possibility of another man picking up their secrets. Too many finishers seem to be more concerned about the results only, rather than *the results and their cost to the company.*

Obtain Complete Data on Latest Developments

The solution to better equipped finishing rooms seems to lie with management in obtaining all the latest available data on new developments; and with the equipment manufacturer doing a real selling job with both the man on top and the man in charge of finishing. Often we hear of a finisher complain-

ing about a material when actually his trouble is local. Paint-service engineers should be able to compile volumes of such incidents.

In the spraying of any finishing material, the spray gun is naturally a most important item. If the spray gun is the correct model for the job and is in proper working condition, with proper auxiliary parts, almost every material can be properly applied. True, methods of material feed should not be disregarded because they all have their place, as will be shown later, but *the gun is the tool.*

Selection of Spray Gun for Type of Work at Hand

The selection of a spray gun for a given job will be controlled by several known factors. These factors include the type and volume of material, (for example, its abrasiveness, weight, body and viscosity, and the amount of such material to be sprayed over a given period of time); the volume of air available; size and nature of object to be finished; and the material-feed system.

In a small refinishing job shop, in which many types of materials are sprayed in one or two-quart quantities, the suction-feed type of gun, with cup and auxiliary equipment, is generally used. In a factory where an operator sprays one material for several hours, using it in quantities of five gallon or more, the pressure-type of gun, with necessary material-feed equipment, should be selected.

If a manufacturer has use for both types of guns but does not want to make the additional investment, then it is advisable to purchase one gun with two sprayhead assemblies or two sets of air caps, fluid tips and fluid needles. The former requires merely the exchange of an assembly, while the latter requires disassembly of the gun.

An objection to this disassembling procedure however, is that spray operators are not always aware of the importance of keeping the removed cap, tip and needle clean and in perfect condition; they may be thrown onto a bench, dropped into a thinner pail or carried around in the man's pocket. As a result the parts become rusty, corroded and often damaged. When these loose parts are reassembled in or on the gun later, the operator finds his gun spitting, streaking or giving a distorted pattern.

The spray gun, with the head removable as an assembly, eliminates this source of trouble. *Having the required number of complete spray guns, so they can be kept intact in and out of operation, is still more desirable.*

Improper Use of Spray Guns

While one can use a suction-feed type of spray gun on a gravity-feed set-up and, under certain operating conditions and with some materials, on a pressure set-up with fairly good results, a pressure-type gun on suction-feed cannot give satisfactory application results. The improper use of certain types of spray guns has been observed in several spray rooms. One in particular, was a factory having three spray booths with a conveyor moving parts to the spray positions and with the factory otherwise apparently efficient and well tooled. Here the spray operators used the same gun for all types of feeds and all types of materials, from light lacquers to heavy-bodied wrinkle finishes.

It is important that spray rooms be equipped with proper tools and that operators are trained to rec-

ognize the different uses of each one. Outside of a few plants where uses are found for flock guns, spatter guns and other special guns, the average operator need not be familiar with more than the two guns previously mentioned, but he should be thoroughly familiar with the use and limitations of each of these.

The selection of the air cap, fluid needle and fluid tip is determined by the type of material to be sprayed, the pattern and atomization desired, feed system, and available volume and pressure of air.

"Spray Gun Troubles" and What Causes Them

Of course, the spray gun in itself is not the answer to all finishing problems because, like any other tool, it contributes its share of troubles. It is important that the operator recognize these troubles as being local and familiarize himself with the gun and its various parts so he can eliminate or remedy the troubles.

Let us consider fluid or air leakage. Usually these can be traced to loose packing nuts, improperly seated valves, foreign matter, broken springs, bent stems, tight packing nuts, wrong needle size or improper lubrication.

Distorted spray patterns can be traced to partially or wholly plugged horn holes, injured air cap, dirt on air cap or fluid-tip seat, improper setting of spreader adjustment valve, and too high fluid or air pressure.

The familiar "orange peel" is often the result of insufficient atomization, or because the gun is held too far from the surface or too close to the surface being sprayed.

Excessive mist or fog is the result of too high atomization pressure, too low fluid pressure, or the wrong air cap and fluid tip combination for the material being used.

Air Hose; Fluid Hose; Sizes

Auxiliary equipment comes in for important consideration in obtaining a first class spray job. From the spray gun we move to the air hose and fluid hose. These hose are usually identified by their color, the air hose being red and the fluid hose black.

In selecting air hose the size is important. For industrial spraying, the recommended size of air hose is 5/16-in. inside diameter. This may be used to connect the pressure-feed tank to the transformer and to supply the air to the spray gun. On small guns, such as those used for touch-up work, highlighting and blending, where the hose length does not exceed 12 to 15-ft., a ¼-in. inside diameter hose can be used.

Care must be exercised in the selection of air hose (as to diameter and length) to avoid excessive pressure drop or "starving" of the spray gun. By "starving" is meant the difference in air pressure at the point of connection, as compared to pressure at the gun. Often the gun or material is blamed, when the real trouble is an inadequate supply of air at the spray gun.

A few examples of this loss are: At 40-lbs. pressure a 15-ft. length of hose 5/16-in. in diameter will lose 3¼-lbs. of pressure; or at 90-lbs. pressure there will be 8½-lbs. of loss. A 25-ft. length of same diameter hose will drop 4-lbs. at 40-lbs. pressure and 10½-lbs. at 90-lbs. pressure. These figures are based on the use of an air cap consuming 12 to 15-cu.ft. of air per minute at 60-lbs. pressure.

The fluid hose should be selected to give sufficient flow of material in volume to assure a wet applica-

tion and sufficient film. The average production finishing requirement is for a hose of ⅜-in. inside diameter.

Material Containers; Pressure Tanks

The last piece of necessary equipment is the material container or that part of the equipment that serves as a supplier for the material to be sprayed.

Cup containers are recommended where a variety of colors, in small quantities, are sprayed. These include "suction", "gravity" and "pressure" types, the different names being self-explanatory.

Overhead gravity buckets are still in use in some factories but they are considered more or less obsolete because of their many disadvantages. Their disadvantages are shown in the advantages of the pressure tank.

The pressure tank, in all sizes from one gallon to 100 or more gallons, is coming into use more every day because of its many advantages. I believe that the best available pressure tank for all purposes is the motor-driven agitator, double-regulator type. The agitator provides constant agitation, whether material is being sprayed or not, thereby eliminating any possibility of settling by the heavy-pigmented materials, and "skinning" on some of the faster-drying synthetic types.

The double regulator provides the desirable atomization pressure from the tank to gun and a control of the pressure on material. Fluid pressure control assures adequate delivery of material to spray guns, thereby permitting application of a wet film. Pressure tanks are available with inner containers to permit a quick change-over from one color to another without cleaning the tank. The use of these inner containers permits the mixture of several batches ahead, which is of primary importance in modern production.

Circulating Systems; Central Mixing Room

The circulating supply system has definite advantages where materials are sprayed in a volume of 30 gallons or more per day. Almost all automobile and refrigerator factories are equipped with circulating systems. The system usually consists of two tanks per color or material. While spraying out of one tank the other tank can be refilled.

The supply tanks are usually centrally located in a mixing room, which localizes any fire hazard. Circulating systems eliminate the handling and trucking of materials. They permit control of viscosity for all spray stations, control of delivery pressure, temperature of materials, and they prevent the possibility of dirt and contamination. One man is usually assigned to filling tanks and mixing paint, thereby minimizing the possibility of any error in material reduction.

From the foregoing one can easily understand the possibilities of maintaining an up-to-date, efficient, spray room with the many varied types of available equipment.

Leo Roon, founder and president of Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J., is the newly elected president of the New York Paint, Varnish & Lacquer Association.

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Moisture in Wood

AND HOW IT AFFECTS FINISHING

Editor's Note: In this article the author points out that many wood finish difficulties arise from the fact that all woods can change in moisture content to a greater or lesser degree. He describes and explains the various conditions that influence wood moisture content. This article should be of particular value to those who want a concise, ready reference on the subject of why and how wood often varies as to the amount of moisture it contains.

BY WILLARD SEEMAN

UNLIKE metals, wood possesses the characteristics of being able to absorb and give up relatively large quantities of water. This fact is of extreme importance in the finishing of woods, since a change in moisture content of a piece of wood to which a finish has been applied may result in damage to that finish in a number of ways.

For example, when wood absorbs moisture it has a tendency to expand and, conversely, when moisture is lost from the wood, shrinking may result. These changes in size and shape may do no lasting harm to the wood but the finish, even a very good one, may not be capable of withstanding the stresses thus placed upon it. The result is checking, cracking, etc., of the finish.

In another instance, a wood of relatively high moisture content may be finished under atmospheric conditions which make the wood tend to lose its moisture. If the wood is losing moisture while the finish is drying, the water vapor seeking to escape from the wood may force its way partially or completely through the finish film and create bubbles or pinholes.

Other specific wood finish difficulties may arise from a changing moisture content. These include, in addition to those mentioned above, peeling, flaking, loss of gloss and depth, non-drying of undercoats.

Factors Affecting Moisture Content

What factors influence the absorption and loss of moisture and the accompanying changes in dimensions of wood?

First, there is the fact that wood cells, when changing in moisture content, do not change to as great an extent in length as they do in width. Consequently, the manner in which a piece of wood is cut from a log has a direct bearing on the change in dimensions accompanying a change in moisture content. All other things being

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equal, plain-sawed* lumber changes more in width with a gain or loss of moisture than does quarter-sawed† lumber taken from the same log. On the other hand, a quarter-sawed piece will exhibit a greater change in thickness than the plain-sawed piece.

Another factor is the difference between sapwood and heartwood. As the name implies, sapwood is the living section of the tree under the bark and extending part way into the tree. It is usually lighter in color and somewhat softer and contains more moisture than the dead heartwood at the center of the tree. Most important from the standpoint of finishing, sapwood is not as resistant to changes in moisture content as is the heartwood.

Still another factor is the specific gravity of wood. In general, light woods (those of relatively low specific gravity) change less in dimensions than do heavy woods for any given change in moisture. This is true even in wood of the same species. There are some exceptions, of course, some light woods showing extensive changes in dimensions and some heavy woods only small changes. However, in most cases the rule holds.

The size of a piece of wood also affects its loss and gain in moisture to some extent. Sections near the surface of any piece of wood change in moisture content quite rapidly. Interior sections, however, change more slowly. It is apparent, therefore, that in any given period of time (particularly short periods) and under any given set of conditions the larger the piece of wood, the less it will change in its overall moisture content and in its dimensions.

There are also factors other than the kind of wood, the way it was cut, its specific gravity and similar characteristics. These may be termed external factors, the most important of which are humidity of the air and circulation of air. As air surrounding a piece of wood becomes more highly humidified (due to addition of water vapor, or to a lowering of the temperature, or both) the wood tends to pick up moisture. If the moisture content of the air becomes lower, the wood tends to lose its moisture content.

Circulation of air affects the moisture content of wood in that stagnant air, particularly those layers near the surface of the wood, soon reaches a practical state of equilibrium with regard to exchanging moisture with the wood. Circulation brings new air to the wood, ready to give up or take up moisture as the case may be, depending on the moisture content of the wood and of the air.

Precautionary Measures

The ideal wood, from the standpoint of finishing, would be one which would neither gain nor lose moisture regardless of the conditions it might meet in construction, finishing, storage and use. There is, of course, no such wood. Of the various woods that are available, the best choice might seemingly be that one which showed the least tendency to change its moisture content. Unfortunately, factors other than finishing (for example, cost, availability, grain, ease of working, etc.) must be taken into consideration when wood is selected for any item and often there can be little choice in regard to any change of moisture content.

*Plain-sawed lumber is that cut with the wide face of the board at right angles to the rays and tangentially to the annual rings. (Also called flat grain or tangentially-cut wood.)

†Quarter-sawed lumber is cut parallel with the rays or at right angles to rings. Also called edge-grain or radially-cut wood.

Faced with the necessity of using one or more woods that may change appreciably in moisture content, *what can be done to minimize the loss and gain of moisture and thus eliminate some of the possibility of finish troubles?*

The answer: First, condition the wood previous to finishing so that its moisture content is approximately the average of what it will be under the conditions of humidity, etc., which the wood will meet in the field. Second, *finish all the surfaces* of the wood to prevent moisture changes as much as possible.

Condition Wood to Minimize Changes in Moisture Content

It is not possible, of course, to give specific information in this space on what the moisture content of a wood should be at the time of finishing. Too many factors such as the kind of wood, where it will be used (indoors. outdoors, section of the country, etc.) require consideration. However, the following suggestions can be made for maintaining the required moisture content as closely as possible to the desired point.

1) Care should be taken that the very fine wood dust resulting from sanding is not packed into the pores of the wood. Such dust picks up moisture very readily and may cause pimpling, etc., after the finish coats have been applied.

2) If water stains are used, allow sufficient time for the wood to dry after staining. If work is finished too soon after staining, pimpling may occur and, when the wood does dry to its normal moisture content, it may shrink sufficiently to cause checking and cracking.

3) Maintain the same proper conditions of humidity and temperature in all parts of the plant. If different conditions exist in different departments through which the wood passes, its moisture content may vary enough to cause trouble.

4) In storing wood, even for short periods of time, make certain that it has been stacked or piled in such a manner that good circulation of air is assured.

5) Do not allow wood to remain close to steam or hot water radiators, hot air ventilators, etc.

6) Protect all wood from leaking roofs, condensation on water pipes, etc.

7) Where gluing operations are followed, allow the wood to stand for a sufficient period to eliminate the moisture picked up from the glue.

8) Check air temperature and humidity regularly so that it can be determined whether to raise the temperature of the air or add moisture.

Finishing Booklets Free

The M. L. Campbell Co., Kansas City, Mo., has just issued new free bulletins, describing and giving full instructions for the proper application of the following finishing materials: Blonde Finishes, Wood Bleaches, Fillers, Clear Lacquers, Ethyl-Cellulose Lacquers, Bone White and Antique Finishes, E-C Lacquer Tints, Paint and Varnish Remover.

Any or all of these new bulletins are available, or a complete descriptive price list, giving authoritative up-to-the-minute finishing methods may be secured by writing direct to the Finishing Service Department of the M. L. Campbell Co., 706 E. 19th St., Kansas City, Mo.

Machine Tool Shipments Doubled

Machine tool shipments for April are estimated at $60,300,000 as compared to $57,400,000 for March and $54,000,000 in February, it is announced by the National Machine Tool Builders' Association. For the year to date, shipments have exceeded $220,000,000, about double the volume for the same period a year ago.

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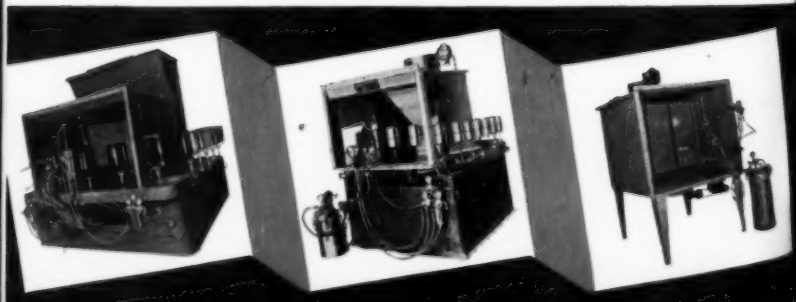
(INSIDE AND OUT)

IN ONE OPERATION

Automobile wheels, pails, shell and bomb casings, clocks, lamp fixtures, floats . . . these are but a few of the hundreds of products now being spray painted *automatically* inside and out by custom-built BINKS Automatic Spindle Machines.

So flexible is the principle of this machine that it is possible to finish the inside of an article with one finish while the outside is receiving a finish of an entirely different type. For example, pails can be lacquered in color on the outside while clear lacquer is being sprayed on the inside.

Not only do BINKS Automatic Spindle Machines make it easy to keep finishing abreast of the most modern production methods, but they actually effect an economy. The famous BINKS automatic spray guns save on finishes and operate only when the product is in front of them. They shut off automatically while passing from one unit to the next.



BINKS Automatic Spindle Machines are designed specially for the product to be finished, after a thorough study of the problems involved. Let a BINKS Engineer survey your needs and give you his suggestions. If an Automatic Spindle Machine is not the answer to your problem, he will suggest the correct type of equipment. There is no obligation for this service.

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I am submitting herewith a manuscript with the title, "When the Finisher and the Formulator Meet", for your consideration as a timely article that might be of interest and value to many of your readers.

The idea for this article developed from my work as research chemist in charge of the development of industrial finishes for W. P. Fuller & Co., San Francisco, California.—

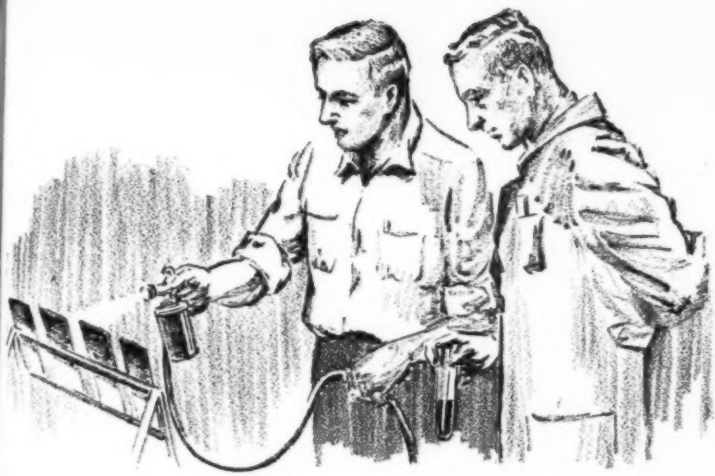
Lawrence A. O'Leary

« When the Finisher and th

THE impact of technical progress in the coatings industry in recent years upon the art of finishing has been tremendous. When World War No. 1 awakened our people to the necessity of developing chemical industries, few Americans then realized that the coatings industry would prove to be such a fertile field for the work of the chemists. In 1915 varnishes and enamels that dried in less than 24 hours were unknown. So, too, no manufacturer of coatings possessed a laboratory worthy of the name.

Towards the close of World War No. 1 and in the years immediately following, our modern system of mass production began to emerge rapidly from its infancy. It was firmly based on science and the scientific method together with the combined skill of artisans in many crafts. As all sciences are based on the discovery and assembly of facts, the pseudo-chemists and quacks, who had dominated the coatings industry since time emmemorial and who had shrouded their meager knowledge in a cloak of mystery and superstition, soon began to disperse as real chemists took over development work in the coating industry.

About 1920, the automobile industry entered a period of great expansion. A serious bottleneck had developed, however, in the finishing room. The first great achievement of the chemists in the laboratories of coatings manufacturers was brought forth to solve this problem —nitrocellulose lacquers. Finishing schedules were shortened from days to hours, a serious bottleneck was eliminated, and the motor car industry expanded to undreamed of proportions. In the intervening years since the solution of the automotive industry's bottleneck in



...nd the Formulator Meet » »

BY LAWRENCE A. O'LEARY
Research Chemist, W. P. Fuller & Co.

the finishing room, almost countless industrial finishing problems, both large and small, have been solved similarly.

Analysis of High Speed Finishing Schedules

A simple analysis of present high-speed finishing schedules reveals two factors which are found in every case, namely;

1) A definite series of finishing operations.

2) A definite time schedule for each finishing operation.

A satisfactory finishing material must be designed to require a minimum of work in each finishing operation and yet meet set standards of appearance and quality. Since a delay in one operation causes a delay in all succeeding operations, uniformity of materials from batch to batch is highly essential. The attainment of this uniformity necessitates a system of close laboratory control in the factory of the manufacturer and a few control tests in the finishing room. The effect of conditions in the finishing room such as temperature, humidity and dust must be determined and controlled.

What are the formulators' tools with which he must work to solve industrial finishing problems? No answer to this question would be complete unless it mentioned the value of the technical training of chemists. That training teaches him how to search for facts and assemble them in a logical manner so that valuable conclusions may be drawn from them. The best way to find facts in practical chemistry is

by experimentation. With this background of training in how to think scientifically and how to carry out systematic experimentation, the chemist is ready to tackle formulation problems in the diverse branches of industrial finishing.

Available Raw Materials; Manufacture of Finishes

While the raw materials available for the formulation of finishes in pre-war days (1910-1913) could almost be counted on one's fingers, the numbers available today are almost legion. Gardner's manual on the Physical and Chemical Examination of Paints, Varnishes, Lacquers, and Colors lists the following in round numbers:

2,000	pigments
300	oils
350	diluents and solvents
400	plasticizers

While many of these have similar properties and differ mainly in their trade names, the formulator must still be familiar with them for economic reasons.

The engineering side of the manufacture of finishing materials has developed with equal rapidity along with other phases of the industry. At the real beginning of the current technical era some 25 years ago, the buhrstone mill was the mainstay of every paint factory. Today it has almost disappeared in the face of competition from the ball mills, pebble mills, multi-roll roller mills and Banbury mixers. In the varnish factory many improvements have been made in the varnish kettles and methods of heating them. Highly efficient centrifuging and filtering machines have replaced the old slow methods of natural sedimentation.

Again the formulator must be familiar with all of these types of equipment and the kind of product which can best be handled by each one. Certain products can be made more economically in some types of equipment and this is highly important in industrial finishes where competition is keen and profit margins are small.

A knowledge of raw material and manufacturing costs is also essential for the formulator. Frequently, it is possible to formulate a product of identical properties with different raw materials or by different manufacturing methods. A knowledge of costs will then decide which raw materials and which manufacturing process will be used.

A point not often mentioned but of great importance in keeping down a manufacturer's overhead expenses is inventory control. It is easier to formulate a particular product by bringing in new raw materials but it is not usually the most economical way. Every formulator must be guided in his work by the economic principle that the greatest number of products possible should be formulated from the least number of raw materials.

Where Ideas and Suggestions Come From

When the formulator has all of his tools assembled, where does he get an idea on how to improve a standard finish or create a new one? There are many sources for these ideas. A new raw material frequently suggests the possibility of creating a new or improved finish. For example, a new type of resin referred to as maleics appeared on the market a few years ago. These resins possess unusually high melting points, solvent release, toughness, and alcohol insolubility. To the experienced formulator these properties indicated the possibility of improving lacquer sanding sealers. As a result, most sanding sealers of today contain

maleic resins and are characterized by fast sanding, toughness, and good lacquer hold-out properties. Similarly, a new development in factory equipment might make possible the design of a finish with new and unusual properties.

Many of the formulators' ideas for new and improved finishes come from the finishing room. The finisher and finishing foreman are well qualified to point out deficiencies of finishing materials in terms of application characteristics, drying, gloss, etc. When the formulator discusses the deficiencies of finishes with the finisher and the finishing foreman and is able to see the operations where the deficiencies occur, he has information which he can translate into improved finishes when he applies the various formulating tools at his disposal.

Laboratory Semi-Plant Set-Up

A knowledge of the finishing operations and conditions is essential to the formulator also, so that he can devise a semi-plant set-up in the laboratory, duplicating as nearly as possible the equipment and conditions existing in the finishing room. *The design of a semi-plant set-up for finishing operations in the formulator's laboratory may be put down as a basic necessity in the formulation of industrial finishes.* It is regrettable that many manufacturers of finishes still handicap their formulators by refusing to install adequate facilities of this nature. Likewise, a finisher who expects a satisfactory solution of his problems is wise to deal only with a manufacturer who has a properly equipped laboratory.

After a formulator has developed a product that works satisfactorily in the laboratory semi-plant set-up, it is taken to the finishing room. It is normal for some "bugs" to show up in the first production runs. Here again the finisher's comments are of inestimable value to the formulator in these final stages of development.

Every Finish a Compromise

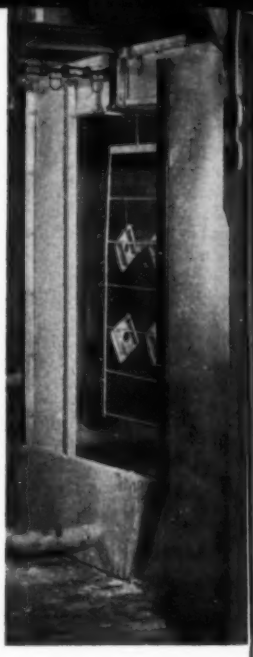
Nearly every finish represents a compromise of properties from the formulator's standpoint. In a sanding sealer, ease and quickness of sanding are achieved by sacrificing durability, toughness, and holding-out properties. The finisher can best advise the formulator how much one property should be sacrificed to favor another useful property.

Much confusion has prevailed in the field of industrial finishes due to improper selling methods. Unfortunately some salesmen who sell industrial accounts have no knowledge of finishing operations or of formulative procedures. As a result the formulator does not receive adequate information with which to solve his problems, and the finisher does not receive essential technical information about the products he is expected to use. I have read hundreds of letters written by industrial salesmen and have heard an even greater number of verbal reports, and not one has ever given an accurate and complete picture of an industrial finishing problem.

While few formulators desire to be burdened with the administrative duties of selling, it is essential for them to talk over mutual problems with the finisher and observe all of his finishing operations. In return for this assistance by the finisher, the formulator can usually design a product that meets all of the finisher's requirements and give him technical information that is essential to him in carrying out his finishing operations.

Stove Company Modernizes Its Finishing System

BY H. H. SLAWSON



This divided picture shows a hydro-filter spray booth. Photo, courtesy R. C. Mahon Co.

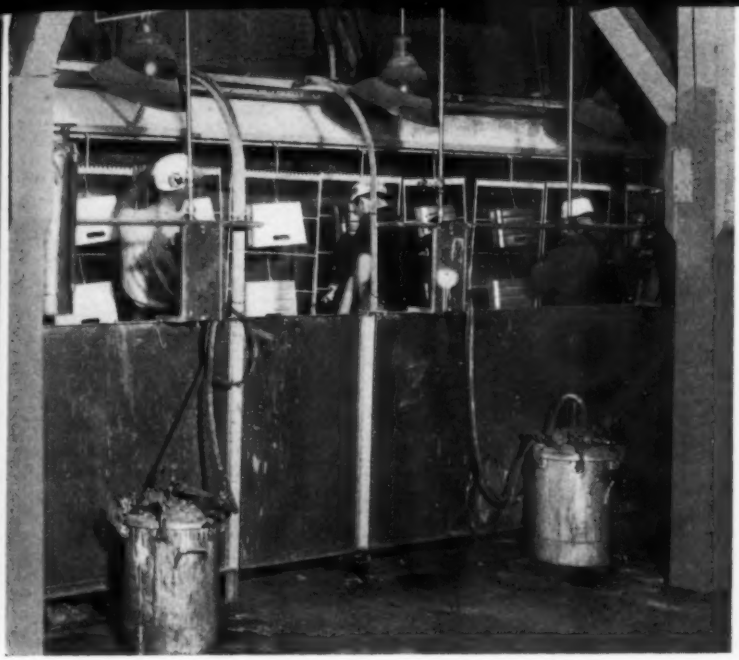
MODERNIZATION of the Florence Stove Co.'s finishing department at its Kankakee, Ill., plant has eliminated a sizeable portion of the former slow and expensive hand operations and presented the possibility of changing from three to two shifts a day, even though production schedules have been enormously extended.

The company manufactures, at this factory, kitchen ranges, stoves and space heaters; also, a line of poultry brooders and camp stoves. Some products are finished in porcelain enamel; others are painted with synthetic enamels.

The automatic metal-cleaning, spray-bake-finishing system, designed and installed by a well known engineering and manufacturing firm, includes a dip tank for japan work, two hydro-filter spray booths with a combined length of 30-ft. for synthetic enamels, two continuous drying ovens located on the factory roof and regulated by remote control, and two separate conveyor lines totaling 1885-ft. in length. The degreaser for this production line was installed under a separate contract by a firm that manufactures degreasers.

This set-up, in general, handles the finishing operations for inside parts and linings of ranges, stoves and space heaters, other than those that receive a vitreous porcelain cover coat. Both plain and wrinkle finishes are applied.

On leaving the machine shop the work is placed on an overhead conveyor which carries it through the degreaser and subsequent operations to the drying oven. This conveyor consists of a standard No.



458 chain with ball-bearing drop-forge trolleys, spaced on 24-in. centers. In addition to the standard hooks for holding the work, specially designed attachments were added at 8-in. intervals from which hang light pieces, so that conveyor capacity may be utilized to the fullest extent. Each conveyor is adequately powered and has a variable-speed reducer to control its rate of travel.

Because of floor space limitations, the degreaser had to be located outside the finishing department. To effect further economy in floor space, the conveyor, on leaving the machine shop, climbs up a 35° slope to the ceiling, as shown in one of the accompanying illustrations. It passes through an opening, travels through a tunnel and then it drops to the floor where the degreaser stands. The weight of the work carried on the descending conveyor balances that on the rising section, so that no extra power expenditure is called for to lift the loaded conveyor line so high.

The Metal Cleaning Process

The automatic degreasing machine is approximately 60-ft. long and 8-ft. wide. It uses the automatic vapor-spray-vapor process. Rising from the floor to enter the machine through the hood at the infeed end, and then descending, the conveyor's load is immersed in concentrated vapors of a non-inflammable, non-explosive organic solvent which is basically trichlorethylene. Solvent vapors, condensing on the metal parts, quickly dissolve the oil and drain off to the bottom of the degreasing machine.

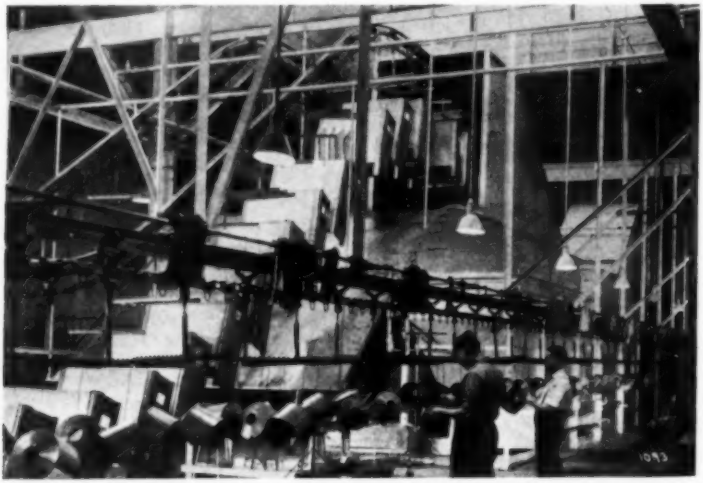
After a few seconds in the vapor, which comes from the boiling solvent in the tank, all surfaces are automatically sprayed with pure solvent coming through fixed nozzles in the concentrated vapors. The force of the spray, in addition to the low surface tension of the solvent, makes it possible to reach hidden spots which, when not properly cared for, commonly cause trouble on the paint job. Solvent for this spray bath comes from the pump in the degreaser, which is continuously supplied with clean solvent from an auxiliary still.

A further rinse then follows in the vapors as the conveyor carries the parts along. The machine is designed so that the parts leave the concentrated vapors as soon as condensation ceases and the temperature of the parts reaches that of the vapors, namely 188° F. As the conveyor rises to leave the degreaser, the volatile solvent dries instantaneously, leaving the stove parts faultlessly clean.

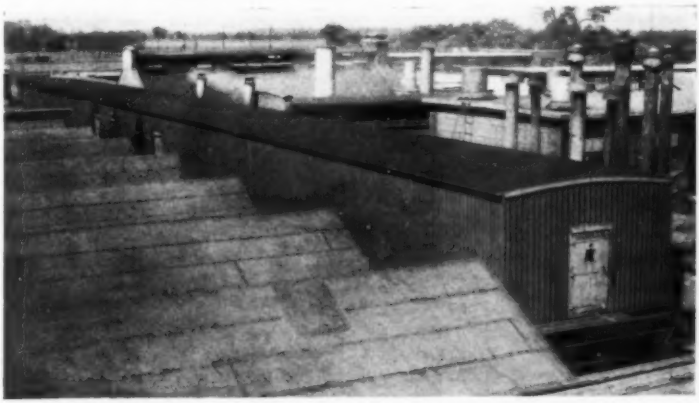
Immersion steam coils heat the solvent and, for solvency economy, a dual vapor control consisting of internal cooling coils and an external water jacket is provided at vapor level. All contaminated solvent is distilled for re-use, with facilities incorporated with the degreaser, plus an auxiliary still. The actual cleaning of the degreaser is necessary only once in one or two weeks. This entirely automatic degreasing operation replaces methods that formerly consisted chiefly of hand work.

Separating Spray Work From Dip Work

Leaving the degreaser, the conveyor makes a sharp turn and heads back at floor level to the paint department. Since pieces intended for both dipping and spraying are hung indiscriminately on



Conveyor in background is taking parts in process to and through the vapor degreaser.



The drying oven (210-ft. long) is on the roof, therefore it occupies no floor space.

the conveyor in the machine shop, they have to be sorted before entering the spray booths or dipping tank. Work intended for the latter station is left on the conveyor line, which, incidentally is 1245-ft. in total length. Work intended for the enamel spray booths is transferred by hand to a conveyor line 640-ft. long. If, however, the preponderant load consists of spray ware, the conveyor line is stopped and a switching arrangement is put into operation. The conveyor chain is "broken" and, by throwing two switches, the spray ware continues automatically through the spray booths, while the dip tank line is entirely cut out. This switching device has eliminated the need of a second degreaser to serve the short conveyor line handling spray work.

The Dip Tank; Safety

For the japan finish the dip tank is 32-ft. long, 3½-ft. wide and 6½-ft. deep, with a capacity of 3000 gallons of liquid. To prevent settling of pigments a re-circulating pump keeps the contents agitated.

In case of fire the tank's entire contents will be dumped automatically into an underground tank through an 8-in. valve, which is held in closed position by a fusible link placed above the dip tank. Further fire protection for drainboards is provided with Foamite equipment. After leaving the dip tank, the work drains for seven minutes before entering the black japan drying oven on the roof.

Spray Booths; Ovens

For surfaces to be sprayed with white synthetic enamel, the company has installed two hydro-filter spray booths, one 20-ft. long, the other 10-ft. These replace five older style booths and permit six men to handle all work previously done, plus the added work now called for by the present increased production schedule.

A feature of each spray booth is the curtain of water which flows continuously over the booth's back wall. Fumes from the spray are drawn into air ducts and discharged above the roof. Provision

is made in the spray rooms for use of masking jigs to produce two-color jobs, as called for by various ornamental effects in stove designs.

Since the two types of finish used require different drying times and temperatures, two ovens are provided in the modernized equipment; to economize on floor space, these were erected on the roof. Steel columns were extended from the factory floor through the roof and steel girders support the oven structure 3-ft. above the roof level. Walls, roof and floor of the ovens are of interlocking steel panels, completely insulated with a 5-in. blanket of rock wool. Weatherproof steel decking forms the outer surface of the ovens so that no additional housing is necessary. Each oven has two doors, equipped with automatically-operated, explosion-type latches. A catwalk built around the structure on the supporting steelwork permits access to the doors.

Each oven is 90x14x9-ft. The equipment room, 30-ft. long, houses the burners, blowers, fans and motors. It is placed between the two separate ovens, to make a continuous steel structure 210-ft. in length, see illustration.

Control Apparatus for Ovens

The ovens are designed to heat a charge of 5000-lbs. of steel at 450° F. each hour. Each oven is operated as an individual unit by identical equipment. Gas heat is delivered through direct fire "surface-combustion" heaters, rated at 3,000,000-b.t.u. per oven, using a low-pressure pre-mix system.

All air is filtered and supplied to the burners through a blower, powered by a 10-h.p. motor. Delivery and exhaust fans are powered respectively by 10 and 2-h.p. motors and a portion of the air is recirculated—with resulting economy in fuel consumption.

Located in the finishing room, on the ground floor, is the control panel for this heating equipment. Recording-type controllers are used and flow switches are inter-connected to supply-fans and exhaust-fans, and also to time-delay units. Before burners are lighted, exhaust and supply-fans are started to drive any explosive fumes from the ovens. Then, in succession, under control of the time-delay units, the pilots are lighted by means of automatic spark ignition, followed by the opening of the main gas valves. "Flametrol" units on the pilots act to cut off the main gas supply in case of pilot trouble or current failure.

Conveyor lines pass back and forth four times in each oven. For the japan work, a period of 30 minutes at 450° F. is allowed, while for white work the time and temperature are one hour at 325° F. Leaving the ovens, the conveyors descend to the factory floor, where the loads are removed for subsequent storage or assembly.

Boat-Painting Book Free

"Keeping Your Boat Shipshape" is the title of a new booklet issued by the Finishes Division of E. I. du Pont de Nemours & Co. It tells in simple fashion all the boat painter needs to know about painting a pleasure craft. The new booklet is a revision of a former pamphlet which has been popular with professional as well as amateur boat painters.

Among the subjects discussed are: the fitting-out period, how to prepare the surface, and how to select the right paint for each job. Instructions for application afford up-to-date information on finishing spars, cabin interiors, cabin exteriors, canvas decks, wood decks, metal surfaces, top-sides, boottopping and racing bottoms. There is a list of "Don'ts" which points out costly mistakes. The booklet is concluded by a discussion of preferred methods of preparing a boat for winter storage.

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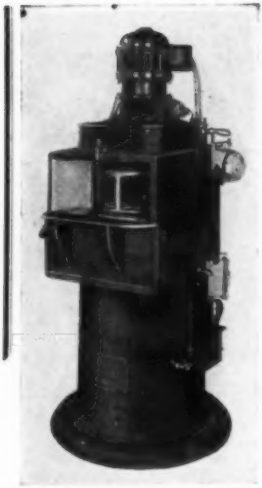

Tumbling VERSUS *Whirling* TO FINISH *Small Products*

BY HARRY DANIELS

Shown at left: A modern "whirl" finishing machine. Opposite page: Three tumbling barrels in service.

TUMBLE finishing has been practiced for years, producing excellent finishes at low cost. In some cases tumble finishing has been combined with final coats applied by dipping or spraying.

Whirl or centrifugal finishing is something more advanced in the way of coating small articles in bulk and is now doing many jobs formerly done by tumbling. It has also made possible the low cost and attractive finishing of many small items which were previously finished less attractively at considerable expense.

Recently I have observed a renewed interest in tumble finishing. It is therefore well to consider the use of the whirling process in conjunction with the tumbling process. Each process performs certain functions to particular advantage, therefore I believe that a comparison of the characteristics of the two processes should enable us to combine them to good advantage.

Soft wood that has not been carefully turned and has not been sanded on the turning lathe may be tumbled upon itself and smoothed up somewhat while in the white. Then it can be filled with a special tumbling wood filler, which is literally driven into the pores of the wood by the tumbling process. A surprisingly smooth surface results, even on soft woods, and the absorbtiveness of the wood is greatly decreased.

Of course, in a whirling machine, which includes bulk dipping in a mesh basket followed by rapid rotation to throw off the excess paint, you don't get the tumbling effect and the results just mentioned. However, on smoothly turned or embossed pieces of hardwood we are not so concerned with any "soaking in" and "beating in" of the finishing material. The finishing material is used in a heavy-body condition and "holds out well" on the wood surfaces.

Neither the tumbling nor the whirling process lends itself ideally to the coating of objects that have "nesting" tendencies (wherein

one piece almost fits into or closely against another) or large flat areas. Nesting tendencies cannot always be accurately predicted, as many objects have been finished by both methods when first opinion would suggest that bad nesting would result. The relation of area to weight has a bearing upon nesting.

The effect of density is also to limit the tumbling process to wood and plastics, and to bulky-formed metal products, whereas the whirling process will handle a wide variety of metal objects of considerable density.

Best Results with Lacquers and Enamels

Lacquer is not always recommended for tumble finishing, as it requires a carefully worked out technique for each different shape being tumbled. Control of ventilation in the barrel is required and this must be coordinated with rate of "spitting in" of lacquer enamels. Few have mastered this process.

The whirling machine is ideal for the application of a single coat of clear lacquer. It is widely used for the application of clear lacquer, but is little used for pigmented lacquers, as covering cannot be obtained satisfactorily in one coat—and application of a second coat tends to "wash off" the first coat.

The tumbling process is equally good for air-drying or baking enamels. The whirling process gives better results with baking finishes. This is due to the fact that a heavier film is applied in the whirling operation, with the result that adjacent surfaces have more film between them and the rupture of this film, after drying, will make a greater blemish than the rupture of the comparatively thin film applied by tumbling one coat. When articles are coated by the whirling process the trays containing the coated pieces are slightly shaken once or twice during the baking operation and, as a result, very little sticking or nesting trouble occurs. This frequent shaking

would be impractical in an air-drying schedule and would result in too many blemishes.

Amount of Reduction Critical

In both operations the amount of reduction (thinning the finishing material) should be established and then adhered to for all future work of the same type. In tumbling, variations will not cause great differences in the finish. In whirl finishing, however, a slight over-reduction may result in the finishing material being almost completely whirled off. Viscosity must be carefully checked and held quite constant.

Size of Unit Batch and Time Required

Tumbling barrels vary in size from what will hold about a half bushel to those that will take two bushels of turnings. Time in the barrel may vary anywhere from 15 minutes to one hour. Whirling machines have capacities of from a peck to a half bushel, and larger ones are being built. Loading, whirling and dumping of the basket will take about two minutes and, if the operator tends the ovens, you can figure from five to eight minutes per batch. The whirling process will respond to demand for increased production by the simple process of dividing the labor of loading, whirling and dumping, and by using one or two extra baskets.

Number of Coats Required; Ventilation Requirements

Tumbling usually requires from one to four coats. In most cases the whirling machine will either put on a heavier coat for a one-coat job or it will put on an equal coating in an operation less.

Tumbling enamels usually are given considerable reduction—anywhere from 25% to 50%. This reducer, and part of the reducer originally included in the enamel, must be evaporated from the work before the turnings are removed from the tumbling barrel. This means that blowers are sometimes set up to sweep the solvent fumes out of the tumbling barrel. Under these conditions adequate ventilation must be provided. Whirling enamels are lower in solvent content than tumbling enamels, and the whirling enamels are given very little reduction for use. This means that a whirling operation will require much less ventilation capacity than a tumbling operation.

Standardization of Operations

It requires considerable judgment and skill to standardize the tumbling operation and this must be varied for each different piece and each coat applied. In whirling there are only two factors to standardize, namely, viscosity of the finishing material and duration of the whirling operation. These standards are easily set up by unskilled help. Once they are established it is easy to duplicate the results.

Uniformity of Coating

The tumbling process produces a coating that is quite uniform enough for many purposes. The whirling process, however, is a precision process, not only by comparison but by absolute standards. The whirling process permits transparent tinted lacquers to be applied to novelty jewelry in such uniform films that no variation in color can be noted on individual pieces or between pieces.

Waxing Operations

The tumbling process may be used for the application of a beautiful smooth wax finish to stained, enameled or varnished turnings. A special inexpensive tumbling wax

There is a first line of defense for industry as well as for national safety . . . comparable lines in that they both stress PROTECTION. Just as a country depends on its armed forces to protect it from enemy invasion, so does the manufacturer depend on a finish to foil the invasion of rust, corrosion, tarnish and a host of elements which could destroy the product if it were not well protected.

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is used. The whirling process does not have this feature.

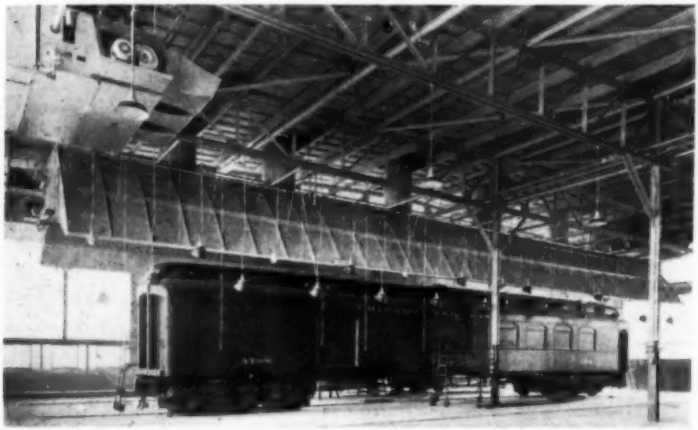
From the foregoing discussion you can select the finishing method best suited to any specified product in the class of those that can be coated by one or both of these processes. A combination of the two methods would be advantageous where soft porous turnings are to be given a smooth finish. Tumbling could be used for "compacting" and filling, and whirling could be used for the application of enamel or varnish.

A large tumbling operation or department could be augmented advantageously by a small whirling machine. The tumbling barrels could be used for the large volume steady production, using standardized procedures. The whirling machine would be used for small lots upon which it is not practical to experiment in setting up a tumbling procedure. It is also possible to whirl-finish a mere handful of turnings or stampings, which is certainly not the case in tumble finishing. In whirl finishing it is possible, with some machines, to change from one color to another without washing or cleaning the machine.

A final word: Set your procedures and then stick to them.

Burn-in Repairs; Stick Lacquer

WHERE one or more lacquer coats are to be applied over a "burn-in repair", I generally use stick lacquer. This stick lacquer works fine under a hot knife; it can be easily "pulled out" to a smooth surface; it provides a tough repair that adheres well and will not swell or raise after being coated with lacquer. If the repair is expertly made, you can not detect it afterwards.—F. W. WORTH.



Overhead canopy exhaust above working area where new passenger cars are spray painted. Air that is blown upward through small slots in the floor, carries fumes to the canopy where the exhaust draft draws it through the vertical stacks. Photo, Binks Mfg. Co.

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BY ROBERT WYSOCKI
Technical Director, The Forbes Varnish Co.

THE practical use of infra-red or radiant energy is not new. The evaporation of the salt water in the sun for the recovery of salt for use in food or as a preservative has been practiced for hundreds of years. The radiant heat of a bonfire or open fireplace, relatively uncontrolled as it is, is probably more familiar to the people of this present day. The toasting of bread in an automatic electric toaster, under more or less precise control, is familiar to all of us. The rapid transfer of radiant energy from the incandescent firebox and fuel bed to the modern water tube boiler in our power houses is a fact accepted by engineers. Wide spread practical application of radiant energy to the curing of paint films is, however, relatively new.

Two and a half years of developing a wide range of types and colors of organic finishes for radiant energy baking and servicing these finishes in the field has resulted in experience rich in the understanding of the radiant energy requirements of paint films.

This article is copy of an address given before the Infra-Red Conference of the Advanced Lighting School, conducted by the General Electric Co. of Nela Park, Cleveland, Ohio, April 24, 1941.

What "Finish Drying" Means

The phenomenon of "drying" of organic finishes may be divided into several classifications, namely:

1) Evaporation of volatile solvents, as in the case of shellac or nitrocellulose lacquers and certain vinyl materials.

2) Oxidation, as in the case of house paint.

3) Polymerization, as in the case of certain synthetic materials such as phenol-formaldehyde or urea-formaldehyde molding compounds.

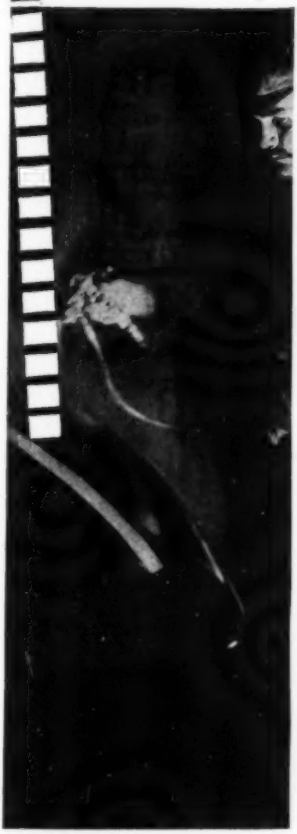
4) Evaporation and oxidation, as in the case of most oleo-resinous varnishes and enamels.

5) Evaporation and polymerization, as in the case of phenol-formaldehyde lacquers and plasticized urea-formaldehyde finishes.

6) Evaporation, oxidation and polymerization, as in the case of certain phenol-formaldehyde and glycerol-phthalate urea-formaldehyde finishes.

It is my intention to discuss radiant energy ovens as applied to these phenomenon. In view of the fact that the film-forming ingredients of most industrially-used or-

ADHESIVE TAPES *and* METAL FINISHING



Keystone View Co., N. Y.

Today, as never before, the trend is definitely toward finishes that aid in appearance and utility. That is why experienced metal finishers place important stress on using a dependable line of pressure sensitive industrial adhesive tapes.

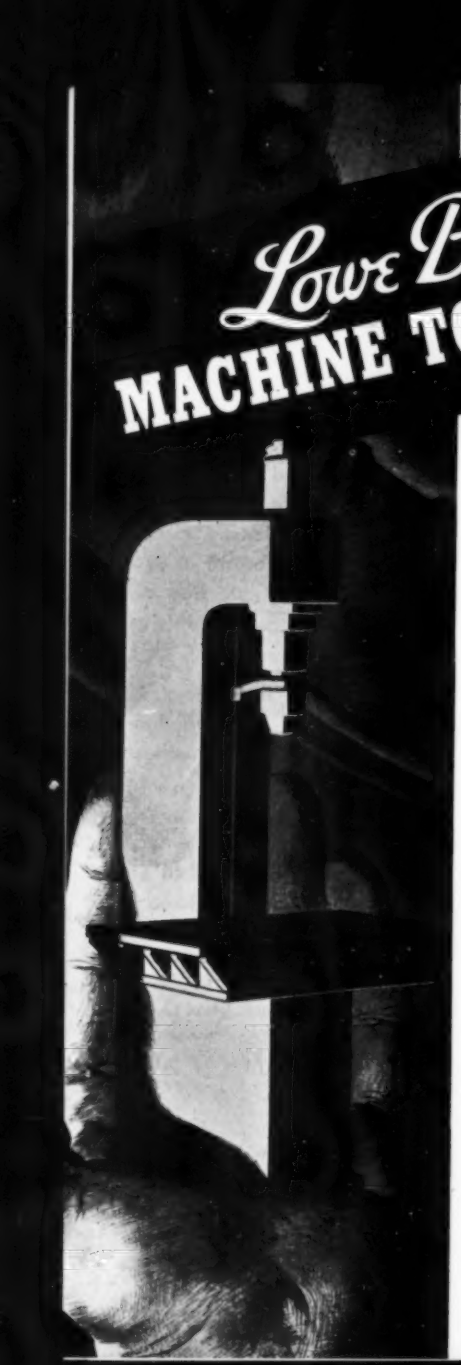
For many years, the Industrial Tape Corporation has supplied metal finishers in many industries with labor-saving paper, cloth and cellophane adhesive tapes, for masking, blocking out areas, general all-around protection of parts and polished surfaces, striping, etc.

Samples on request

Why not tell us about any special tape problem you may have? Our laboratory will help solve it, without obligation.

INDUSTRIAL TAPE CORPORATION

NEW BRUNSWICK, N. J.



Lowe Brothers MACHINE TOOL FINISHES

THE RECOGNIZED STANDARD OF A VITAL DEFENSE INDUSTRY

Spearheading the drive for all-out defense production today are the hundreds of precision makers comprising the Machine Tool Industry.

More than ever before, these makers know full well that the equipment they turn out must perform with maximum efficiency under the pressure of peak operations—and be dressed for the part in finishes which reduce eye-strain and accentuate utility.

So, it is natural that these critical makers of precision equipment should select Machine Tool Finishes by Lowe Brothers to stand up longer under rough usage; resist abrasion and moisture, hammer blows and hot oils, cutting compounds, greases and alkalies; retard rust; offer utmost resistance to chipping, flaking and discoloration.

In other words, Lowe Brothers Machine Tool Finishes are the first choice of a vital defense industry—the recognized standard of durability and economy by which all others must be judged.

But let us tell you the complete story of Lowe Brothers Machine Tool Finishes. It is a story with a moral for you and your finishing problems.

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THE LOWE BROTHERS CO.
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Special Attention Given Inquiries Concerning Products For National Defense

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Lowe Brothers
SPECIAL INDUSTRIAL FINISHES

ganic finishing materials are either solids or at best very viscious liquids, these solids are cut or dissolved in various volatile organic solvents or thinners, so as to be thin enough to be readily handled in spray guns or dip tanks.

Evaporate the Solvents

The first consideration, then, is to get rid of or evaporate these solvents. This can be done without cost or expenditure of electrical energy by exposing the painted articles to the air of the paint room and allowing the solvents to evaporate spontaneously. In fact this is done, in part at least. in most cases, as it requires from a fraction of a minute to perhaps five minutes or more for the painted work to reach the baking equipment from the spray booth or dip tank, and during this time an appreciable portion of the solvent is disposed of. *In order to obtain the advantages of fast production schedules it is necessary to evaporate the balance of the solvents in a short time, and this is where the lamps begin their work.*

Here the increased temperature causes the solvents to evaporate faster. There is definite danger of too much heat with its accompanying faults, blisters and porous spongy non-homogeneous films. More energy than is required is also a waste of power, and an uneconomical procedure. It is evident, then, that the first section of the oven should have definite but gentle heat to remove the solvents without disturbing the paint film. Energy densities of 1½ to 2½-watts per square inch are suggested depending on kind of finish, the solvents to be evaporated and the mass of the painted work.

If the finishing material is a nitrocellulose lacquer or some other material drying by evaporation alone, then the job is finished and there is no need for further consideration of drying lamp equipment. However, in view of the fact that most applications of drying lamps concern finishes that dry also by polymerization or a combination of polymerization and oxidation, in addition to evaporation, we must go farther in the second section or zone.

Polymerization; Oxidation of Film

Polymerization and oxidation rates are a function of time and temperature; that is low temperatures require long times and high temperatures require short times to completely cure the finish. It is obvious then, in order to save time and space, both of which are valuable, that the temperature be raised to a value determined by the particular paint, in as short a space of time as possible or economical. This of course, requires a high concentration of energy. Here the energy density may run from 2 to 2½ to upward of 4-watts, again depending upon the finish involved and heat capacity of the painted articles.

Heat Zones to Suit Progressive Paint-Drying

Once the proper curing temperature has been reached, energy need be applied for the balance of the curing time only to overcome that lost by radiation from the work and by convection currents of air that find their way into and through the lamp tunnel. In this, the third zone, the value may be higher or lower than that required in the first zone, depending on circumstances, and may vary from 2 to 3-watts per square inch.

How is this variable density to be obtained? There are several

Compelling Attention

As the charming model glorifies the mountain stream and rugged vale, so will the proper finishing materials glorify your product.

For the purpose of giving your commercial products the attention-compelling allure that will make them more sales-worthy, we offer the services of our Creative Studio without cost or obligation.

Write us about your products and let us give you complete details regarding our facilities and experience in creating finishes.

ROCKFORD VARNISH COMPANY

Manufacturers of Finishing Materials

ROCKFORD • ILLINOIS

NO TAMPERING WITH QUALITY

The vicious finishing circle—A T

. I. DU PONT DE NEMOURS & COMPANY (INC.), FINISH

—AND THE MAN WHO STRAIGHTENED IT OUT

A MANUFACTURER of hospital furniture had a "bottleneck" in production. His finishing system dried too slowly. The finish wasn't hard enough, due to underbaking. And higher temperatures couldn't be obtained in the oven. Capital was tied up in inventory. And—to top off this vicious circle—the manufacturer was unable to buy new baking equipment.

Then a Du Pont representative was called in. He found the finishing system in use consisted of: (1) a primer; (2) a filler coat; and an enamel top coat—each baked separately at 180°F. for a total of 23 hours.

In short order, the Du Pont man saw what was needed and recommended an entirely changed system. It consisted simply of: (1) spot spraying a Du Pont primer, followed by a coat of the same primer, and allowed to set for 30 minutes; and (2) a final coat of enamel—both primer and enamel to be baked at the same time *for only 2 hours at 180°F.* (as compared to the former 23 hours!)

The result? Increased production . . . improved appearance and durability of the finish . . . reduced inventory . . and no need for a new oven. This typical case shows why so many manufacturers consult with Du Pont on finishing problems . . . why they place confidence in Du Pont's wide knowledge of finishing processes!

They know their problems are in the best possible hands . . . that Du Pont chemists, technicians, engineers and representatives are skilled specialists who combine "know-how" with the finest facilities for developing, making and applying better finishes.

They regard Du Pont as part of their own paint department. And they know finishing problems of the future will also be answered by Du Pont.

"New Frontiers Through Chemistry"

. . . yours for the asking!

▶ This interesting new book, prepared by Du Pont, describes many of chemical science's discoveries; the research, the testing, the inside story of many of chemistry's sensational triumphs.

For your FREE copy, just write to: E. I. du Pont de Nemours & Co. (Inc.), 7154-J, Du Pont Bldg., Wilmington, Delaware.

FINISHES DIVISION, WILMINGTON, DELAWARE

DU PONT

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VOLUME IV

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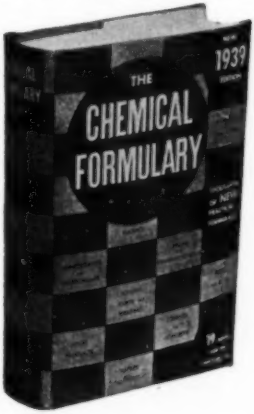
Over 600 pages containing thousands of practical formulae — many of which have never before been made public. One formula may be worth hundreds of dollars to you.

A condensed collection of new, valuable, timely, modern, practical formulae for making thousands of products in all fields of industry. (See partial list of contents below.)

The experience of hundreds of chemists and engineers is now available to you. Use it and profit. *Have at your finger tips the boiled-down essence of the latest commercial methods of hundreds of chemists, engineers, technicians and professors. Have it when and where you need it.*



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If you do not have the previous volumes, get all four if you can afford it. Or start with Vol. I, and after you have that, we know you will want the others. Remember, each volume is different and complete in itself!

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methods one or more of which are practical in most cases.

1) Lamp spacing can be varied, using greater space between lamps for the low-density zones and close spacing for high-density zones, with but one size of lamps in a given installation.

2) Lamp wattages can be varied, using lower-wattage lamps for low-density zones and high-wattage lamps for high-density zones, with uniform spacing for all lamps.

3) The lamps in any single zone can be connected to the line through a tapped or continuously-variable autotransformer. In this case simple adjustment can be readily made at any time to suit various circumstances.

4) In view of the fact that drying lamps are designed for 115-volts, and most industrial supplies are 220 or 440-volts, lamps can be connected three in a series on 220-volts or five or six in a series on 440-volts, thus getting lower densities with uniform spacing and but one lamp size.

5) Combinations of the above methods.

We now have an oven with the longitudinal energy distribution arranged in accordance with the requirements of the "paint"—low at the first or starting zone for orderly removal of solvents, high in the second zone for rapid temperature rise, and moderate or just enough to make up losses, for the third or baking zone to maintain a uniform temperature until the paint has properly "cured".

Solving the Problem of High Heat at Top of Oven

For some applications this suffices and will do an admirable job. However, a very general understanding of heat and hot air will show that the upper part of an oven will run at a somewhat higher temperature than the lower part. The higher the oven the worse this condition becomes. Temperature differences of as much as 80°F. have been observed in radiant energy ovens of moderate height. With some finishes, such differences are of no great importance provided that the lowest temperature at the bottom of the oven is sufficient to give an acceptable cure in the allotted time. Many of the modern synthetic finishes of today however will not tolerate such wide temperature variations and give uniform results. They may overcure and give brittle films or under-cure and not measure up to the required standard. Further, some of the lighter or sensitive colors may show variations so great as to be unacceptable. This variation of temperature can be overcome by spacing lamps at the bottom of the oven from 15% to 25% closer together than at the top, and a relatively uniform distribution of temperature will be achieved.

Our radiant energy oven now has the energy input arranged longitudinally to conform to the requirements of the paint film, and vertically to maintain uniform temperatures at both top and bottom.

Securing a "Flat Distribution" of Radiant Energy

Our next consideration is the uniformity of the radiant energy in the plane of the work. In view of the fact that the source of this energy is a disconnected series of points or small areas (the area of the lamp filament) and the working plane is a relatively large area, it is desirable that considerable thought be given to the choice of reflectors and lamp equipment so as to secure as flat a distribution of radiant energy as possible. This will eliminate under-cured and over-cured areas.

It must be borne in mind that the design of the radiant energy oven can be varied, and often is best varied for the purpose of meeting special requirements. Thus an oven designed exclusively for wrinkle enamels may require a longer low-density first zone than smooth enamels to allow the wrinkle pattern to fully develop before reaching the high heat or curing zone.

Radiant ovens have been designed for a wide range of work from curing a coating on pin heads or a strip of paper or an enamel on a sledge hammer head, to drying the finish on prefabricated steel houses. Each application requires careful consideration of all the factors involved in order that the oven can be practical, efficient and economical to use. This requires close cooperation between the manufacurer ordering an oven, the oven designer and builder, and the paint manufacturer whose paint is to be used, in order that all factors be given necessary consideration.

New Metal Cleaning Compounds

Several recently developed cleaning materials and methods specially designed to help speed-up output in National Defense Orders or other rush production chedules were exhibited at the Western Metal Exposition and Congress, Los Angeles, Calif., by Oakite Products, Inc., New York, N. Y.

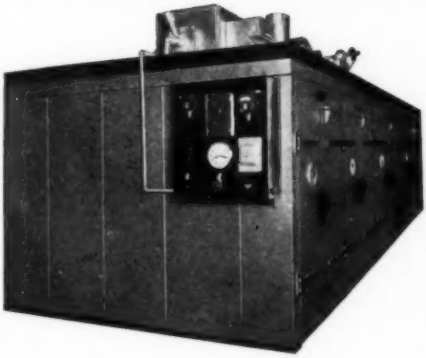
The first of these developments, one that marks an important contribution to the technique of resistance spot-welding of aluminum and its alloys, is a new, speedy method of surface preparation that is reported to make possible more welds before electrodes must be cleaned, and also to provide greater safety to both personnel and parts.

Other Oakite developments of particular interest to aircraft and other plants fabricating aluminum and its alloys include safe materials and methods for cleaning heat-treated aluminum parts, and cleaning before anodizing or similar protective surface treatment.

The exhibit depicted in motion the application of Oakite materials in such other production operations as cleaning cold-rolled steel, buffed brass, copper, zinc, and other materials and alloys before bright nickel, chromium and cadmium plating; washing iron and steel parts either by tank or machine methods before inspection and assembly; cleaning before pickling, tinning and galvanizing; rust-proofing parts in process or for storage; cutting and grinding; drawing and stamping; burnishing and tumbling.

No, there isn't any finishing going on right here at present but we admire big airplanes and here is the world's largest—the Douglas B-19 Army bomber. It has a capacity of 11,000 gallons, while the tank body of the 1½-ton Dodge truck holds only 1115 gallons. The flying range is 7750 miles, non-stop. It is at its hangar in Santa Monica, Calif.

GKS Truck Type Ovens



4 TO 5 WEEKS DELIVERY

Only standard size ovens, manufactured on a production line basis, can meet such a delivery schedule. GKS offers this outstanding advantage to purchasers, plus economy, flexibility and efficiency possible only in standard size ovens.

GKS Standard Truck Type Ovens are manufactured from standard units so that the utmost flexibility is possible. Beginning with a basic unit (right) standard 2'-4" sections are added to the depth and additional compartments to the width (above) . . . to create an oven that meets your production schedule. Ovens of desired size and capacity can be purchased most economically from GKS!

WRITE IN DETAIL CONCERNING YOUR INDUSTRIAL OVEN PROBLEMS

Established in 1873

GEORGE KOCH SONS, INC.

EVANSVILLE, INDIANA

Speed-Dry Filler

A new quick-drying filler called "Wear Master Speed-Dry Filler," has been developed for the furniture industry by Standard Industrial Products, Inc., Evansville, Ind.

Quoting from the company's announcement:

"It dries ready for sealing coat in less than one hour, and may be used under usual finishing materials. It is just as easily handled as the best quality fillers now in general use in the wood-finishing industry. It assists in building durability into the finish, never turns grey or brittles the finish, is not affected by climatic or weather conditions, does not shrink or raise in the wood pores, and it contains no toxic ingredients.

"This filler has proved, through results now being obtained by furniture manufacturers, that it will actually cut costs and have every desirable characteristic of the best quality filler obtainable.

"It is of vital importance to wood furniture manufacturers who are concerned with the necessity of increasing the speed with which furniture may be moved off the finishing room floor into the packing room.

"Furniture manufacturers who are using walnut, mahogany or oak woods, air-dry this speed filler from 10 to 15 minutes; then apply sealer. However, when it is used as a slush filler in uniforming soft woods, it may require nearly an hour to air-dry for recoating. But in no case will it require a full hour to dry ready for the sealer coat."

Corrosion-Resistant Paint—"Tygon"

Tygon paint is primarily for the protection of process equipment subject to corrosive action of fumes, condensates or occasional spillage. Its resistance is effective against all such fumes and condensates with the exception of those arising from chlorinated solvents. It provides excellent protection where severe vapor or fume conditions exist; or for surfaces subject to occasional spillage of corrosive solutions. It is ideal for the protection of building steel or for miscellaneous equipment exposed to plating or pickling room atmospheres.

Tygon floor paint provides a tough, durable, easy-to-clean long-wearing surface impervious to grease, acids or moisture. It will adhere to concrete, wood or steel. The "clear," in a special non-toxic form, is an excellent lacquer for lining food containers, forming a hard transparent odorless and tasteless film that resists attack by food acids.

As with all paints certain principles of application must be followed. The surface to be painted must be thoroughly clean, free from grease, loose dirt and grit. In painting bare metal a base coat of Tygon primer is necessary; if another color is desired it may be applied directly over the base or priming coat. In fact, as in all paints, a primer is always to be recommended . . . . two coats are better than one . . . . and three coats will provide even greater protection.

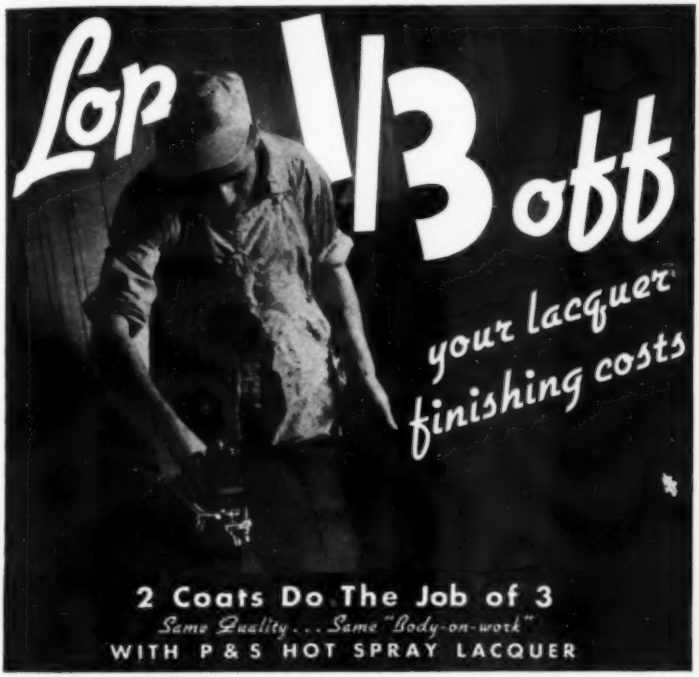
Should thinning be required it is important to remember that Tygon thinner must be used.

Likewise, Tygon paint solvents normally used are toxic and extreme care must be taken to provide ample ventilation when applying same. Care, too, must be taken against the danger of fire, as regular Tygon solvents are inflammable. Special grades of Tygon are available for use where the fire hazard is extremely pronounced.

This material is a product of The United States Stoneware Co., 60 E. 42nd St., New York, N. Y.

New . . .

MATERIALS SUPPLIES EQUIPMENT



It's the *solids* in lacquer that count in your final finish. The addition of thinner actually *dilutes* the lacquer. To obtain spraying consistency with P & S Hot Spray Lacquer, *heat and heat alone* does the "thinning," so that *all* the original solids remain intact at the gun. This means you spray *more solids* with each Hot Spray application. Exhaustive practical tests prove that two P & S hot-sprayed coats produce the equal of three cold-sprayed . . . identical film thickness and durability, plus extra smoothness . . . Beyond that you save upwards of 1/3 on materials and labor! Add to this the economies in time and handling cost, and it's plain to see why so many progressive wood finishers with volume production are switching to P & S Hot Spray Lacquers! Want the whole story and working details? Write

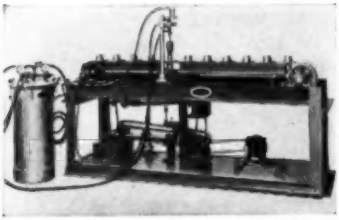
PIERCE & STEVENS • INC.

716 Ohio Street : Buffalo, New York

Sprays Shell Interiors

The Eclipse Air Brush Co., 400 Park Ave., Newark, N. J., is building automatic spray equipment to handle the coating of the inside of trench mortar shells or other objects having a conical interior.

The company's latest machine is entirely automatic except that the shells are put on and removed manually. The shell is placed in a holder on a chain belt; it is carried along until it comes up to an automatic spray gun



Coats the insides of shells automatically.

where it is elevated on a special device that spins it as it fits over an extension nozzle attached to the automatic spray gun.

The timing of the machine is so arranged that an even coating is obtained on the cone-like interior, and the machine will not spray unless there is a shell in the holder.

Rate of operation is 1,000 an hour, using only 15-lbs. pressure on the material and 20-lbs. on the air.

Prevents Condensation Drips

A coating of Insulmat will prevent condensation from forming on cold surfaces during summer days when the atmosphere is heavily loaded with moisture. We all know how the dripping from cold pipes, ceilings or other surfaces can prove harmful to products stored or in process of manufacture.

There has been developed in the plant of the J. W. Mortell Co., Kankakee, Ill., an industrial paint manufacturer, a new product called Insulmat No. 595. This material is a spray-on plastic compound containing specially treated cork particles, guaranteed to absolutely eliminate condensation drip. It is self-bonding, requires no priming coat, adhesive or supports, and can be applied to any metal surface. There is no upkeep and it is said to last as long as the metal to which it is applied.

At Purdue University, Insulmat No. 595 has been subjected to intensive vibration and other severe tests under various conditions and has been found to possess unusual adhesion, to be odorless, and to form a valuable protective coating to metals.

Duracote Finishes for Plastic Surfaces

The field of metal substitutes is of necessity a very interesting one today. With the National Defense effort withdrawing more and more metals from the average manufacturer's products, it is of primary importance to replace them with some form of molded plastic or composition material. The use of plastics has been growing steadily for several years and has already assumed the proportions of a large industry. Now it must assume that of a major industry in order to take care of the requirements of the average manufacturer.

At the present time, plastics are molded economically only in the darker colors. In the case of radio cabinets, it has been found that it is much less expensive to finish cabinets with a high grade thermosetting synthetic enamel in white or ivory, than to mold in those colors. In the case of manufacturer using many different colors on the same article, it is much more so.

The Tousey Varnish Co., 520 W. 25th St., Chicago, Ill., has developed one of its Duracote Finishes especially for this type of application. Some of its interesting features are: 1)

(Continued on page 69)

Pants to match your coat and vest . . .

and when we say MA[illegible]C

whether it's a Production Proble[illegible]

It's just as if your Finishing Problems were the coat and your product requirements were the vest. Ferro's VEDOC technicians are trained and experienced to select the "pants to match"—a finish that exactly solves your problems and meets your requirements. VEDOC Liquid Plastic is manufactured to *your* specifications.

It can be applied with the average synthetic enamel setup, but if you feel your production could be improved, consult

Vedoc THE LIQU[illegible]

MATCH we mean MATCH

on Problem or a Finish Requirement

FERRO'S engineers. They'll plan ideal equipment for you and take fixed responsibility for your entire finishing setup. Ferro also manufactures the ovens, dryers and other finishing-room equipment.

You can depend on Ferro and VEDOC to match your "coat and vest" every time. Place your problem in our hands today!

Liquid Plastic Division

FERRO ENAMEL CORPORATION

Cleveland, Ohio

QUID PLASTIC FINISH!

Vedoc

THE VERSATILE, ECONOMICAL, DURABLE, ORGANIC COATING—SUMMED UP IN 10 POINTS

1. Ferro developed a converting process that arrests development of plastic material in such a way that a liquid plastic is formed. This is VEDOC, which can be applied by dipping or spraying and then baking.
2. VEDOC WHITE in one coat will produce on primed or unprimed metal a smooth and lustrous surface.
3. There is an especially designed VEDOC for every product.
4. VEDOC is designed to bake at a variety of time and temperature schedules.
5. VEDOC stays white, is non-yellowing. Covers in one coat. Has high gloss and is easily washed.
6. VEDOC is not brittle but tough; firm and hard it resists the entrance of dirt and grime.
7. VEDOC is made in both WHITE and BLACK. Colors are made up only on special order.
8. VEDOC will be supplied in limited quantity for free demonstration in your plant.
9. Ferro will engineer and install for you the most efficient equipment for application of VEDOC.
10. VEDOC can be applied in the average setup for use of synthetic enamels.

ease of application; covers solidly in one coat without bubbles, orange peel or wrinkling; 2) quick baking; cures to a hard, glossy, mar-proof finish in 15 to 45 minutes at temperatures of 250 to 300°F.; 3) marvelous adhesion; sticks tightly to "hard-to-adhere-to" plastic surfaces; 4) durable; color remains permanent, surface resists marring, no checking, cracking, peeling, or other defects; 5) economical; excellent hiding power and spreading capacity results in low unit cost.

Infra-Red Bake Finish

The Lowe Bros. Co., Dayton, Ohio, announces a new line of finishes especially formulated for baking by infra-red ray lamps. The line includes primers, undercoats and top coats in a wide range of colors. These new materials, when applied properly to clear metal surfaces, or to any kind of surfaces that can be finished by any other baking method, produce a durable flexible coating that is remarkably wear resistant.

Appropriately named, "Infraline", these new materials are available in smooth, wrinkle and "Metalustre" finishes. They are especially outstanding for their uniformity. Further information can be obtained by writing the company.

New Rustproof Finish; Black on Copper

The Alrose Chemical Co. of Providence, R. I., originator of the famous Jetal Process for blackening iron and steel, announces a new Electro-Jetal Process which gives a black rustproof finish on copper by anodic oxidation. Any metal that can be copper-plated can be blackened by Electro-Jetalizing. After preplating with copper, products are immersed in a special electrolytic oxidizing bath for 2 to 5 minutes. The resulting velvety black surface of Electro-Jetal is an excellent absorptive base for an after-treatment of oil, wax or lacquer which gives a non-porous, rustproof finish equivalent to ordinary nickle plate.

The new Electro-Jetal bath can be operated at any temperature below the boiling point of water, using ordinary steel containers, heated by steam coil. Work can be oxidized on racks, in bulk or baskets. The chemical cost, exclusive of the copper plate, is approximately 25c per 1000-sq.ft. of surface. The process is practical and is now being used industrially. One firm alone is Electro-Jetalizing over 260,000 small parts per day!

Samples to illustrate the Electro-Jetal finish will be furnished by Alrose Chemical Co. on request.

Polishing Compound Adds Luster

Development of a new polishing compound, designed to give a high luster to Dulux synthetic resin and Pyralux pyroxylin lacquer finishes, is announced by the Du Pont Co., Finishes Division, Wilmington, Del. The material is especially adapted to touching up, as it is described as having a mild and abrasive action. It has been designated as VZ-1090 Extra Fine Polishing Compound No. 45.

Preparation for VZ-1090 calls for thinning with 1/10 part of water. Small amounts are applied to the surface with a dry cloth and rubbed with considerable pressure, which is reduced as the compound dries and develops gloss.

The cleaning-up operation is accomplished with a soft clean dry cloth or dry buff with "Amcor" No. 5 or lamb's wool discs, company specialists advise.

Waterproof Finish

A flat finish for furniture—one that is waterproof and liquor-proof, as well as being impervious to milk, rancid butter, grease, urea, etc.—is announced by Perfection Paint & Color Co., Indianapolis, Ind. According to the company's statement, panels coated with this material can be immersed in water for a month and there will be no ill effects to the finish coating. These flat finishes contain no stearates

or other flattening agents. The company declares that they are made of 100% pure gum, therefore they are as clear as gloss varnish.

"The Factory of Tomorrow"

The new factory of Industrial Tape Corp. (a subsidiary of Johnson & Johnson) at New Brunswick, N. J., was inspected by 30 representatives of the trade press on May 16. It is so original in design, appearance and appointment that the name, "The Factory of Tomorrow", immediately suggests itself.

Products of the establishment include industrial masking tapes—cloth-backed tapes, paper-backed tapes, cellophane tape and specialty tapes.

The building is 178x204-ft. with a mezzanine that measures 49x71-ft. Floor area is 58,456-sq.ft. The clear height inside is 14-ft. 1-in.; total height is 22½-ft. It has a concrete foundation and floor; the walls are tile with face brick at the front; steel truss work supports a wood roof. Column centers are 38-ft. by 35-ft. 3-in. The glass is Aklo plate, heat-intercepting to cut 75% of heat and glare. The plant has air conditioning, fluorescent lighting, a "Super Therm" heating system, glass wood insulation and acoustic plaster.

Why this plant was designed and built as it is, we quote a few comments from the executive group:

"The factory of today and tomorrow must be built around the idea that there is no such thing as common labor. Modern people are neither common nor laborers. We have reached a state of society where all of us are technicians, and it naturally follows that we must provide improved working conditions to a point that is suitable to those who care to join us in our business.

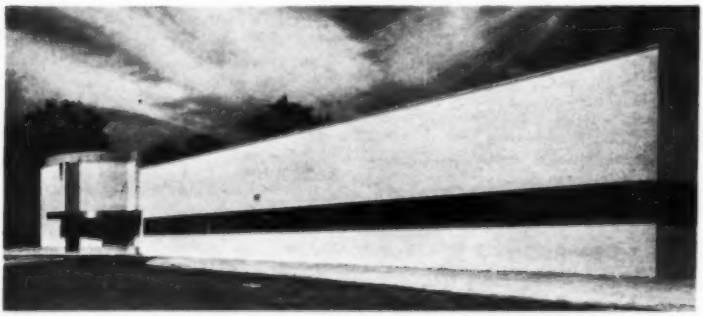
"These unit plants are not only an attempt to develop an architectural achievement and aesthetic surroundings that will be assets to the community, but are an effort to bring about a greatly simplified form of management and a direct and intimate contact with all who work with us.

"Executive offices should be so designed as to make for the greatest comfort of the occupants, and so placed as to bring management and production into one unified group. These operations, as far as possible, should be wholly self-contained and set up in such a manner as to require little if any outside servicing.

"Finally, we are eager to develop a sense of teamwork and a knowledge of the product from the receiving department to the shipping room by every person working in the plant, and a sense of undivided responsibility on the part of management. We are aiming at the simplified approach to every industrial task and the policy of direct action."

Wood Finishing Report Ready

The Committee on Wood Finishing of the American Society of Mechanical Engineers Wood Industries Division has completed a report which will be of interest to members engaged in this industry. The report is available without charge to members registered in the Wood Industries Division of the Society upon request. It is available to other members of the Society at 35 cents a copy, or to non-members for 50 cents a copy. The Committee preparing this report is as follows: M. J. MacDonald, Chairman; Max J. Danziger; John E. Hanle; Joseph King; A. C. Fegel; Thomas Trowbridge.



Cory & Cory, New York, N. Y., were architects for this new Industrial Tape Corp. plant

You can always Depend on MILBURN

FINISHING, WELDING and CUTTING EQUIPMENT

TYPE OM SPRAY GUN—Light in weight, compact. Operates as production unit for continuous service or for touch-up work. Features "Hollow Air" atomizing principle. Top efficiency with all types of spray material.

MILBURN CUTTING AND WELDING TORCHES—Sturdily constructed to highest government standards. Illustrated is the Type HMS—a modern development in the welding art. With attachments it can be used for welding, brazing, soldering and cutting.

MILBURN CUTTING AND WELDING TIPS—Made of special rolled copper and embody outstanding features to give high efficiency, longer life and lower consumption of gas. Interchangeable.

Write for complete catalog of paint spray equipment, welding and cutting apparatus and regulators.

The ALEXANDER MILBURN Company

1402 West Baltimore Street — — Baltimore, Maryland

Doped Fabric Sticks

Would you please offer any suggestions you might have on something to apply on sheet aluminum, which is covered with airplane fabric and then doped with clear nitrate dope, to keep the fabric from adhering to the aluminum?

I would also like to know if there is anything I can apply to wood to keep the same fabric from adhering to the wood—G. F. R.

We suggest that you wax the aluminum surface, coating it with paraffin wax, floor wax, furniture wax or some other wax that proves by test to be suitable and reasonable in cost. It would seem to us that the same or a similar treatment could be applied to plywood to prevent fabric from adhering to it. We are wondering if you have tried waxing the surfaces? On the wood, you might give it a pretreatment of oil before applying the wax.—ED.

Substitute Finish for Flexible Steel

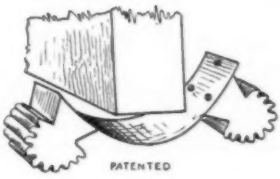
We own and market the Jay-Way Door Holder now being manufactured in a Conn. plant. Our manufacturer is unable to furnish the bright nickel finish required, owing to the defense situation, and we know that it is difficult if not impossible to find another who can.

Will you kindly suggest a substitute finish for the bright nickel—one that will be flexible and durable and not any more expensive? We have been told that you might do this for us.

We now use green and brown lacquer finish on our more expensive models and do not want a finish which would conflict, as our

Questions; Answers

Questions are welcome and will be answered promptly by mail. Readers are invited to prepare and send in additional information relating to any of these questions and answers.



metal part is all the same. The finish and boxing make the difference in the price.

The circular we are sending you will give you a fair idea of our product. The top plate is .011 clock spring steel and is subjected to constant flexing, as you will understand.—JAY-WAY CO.

We suggest a metallic finish, such as aluminum or bronze, for example; or one of the several pigmented metallic lacquer finishes which give the appearance of metallic finish in color, or a "hammered finish" (looks like hammered metal) which may be obtained in any one of several colors. Or, if these "look too good" you may try something in solid colors. Several manufacturers who advertise in this publication can supply you with finishing materials that will withstand flexing of the metal. —ED.

BETTER LOOKING CABINETS 25% GREATER OUTPUT—

WITH SHERWIN-WILLIAMS FINISHES!

Sparton 1071 RPA Radio-Phonograph combination, with home record maker—the radio that "does just about anything." Sherwin-Williams finished.

Ever hear how Sparton — "radio's richest voice"—came to use Sherwin-Williams finishes on their Sparton radio cabinets? They ran tests of leading finishes on coded cabinets—measuring materials and checking application time. Six cabinets were picked by company officials as the best, and when decoded they were *all* found to be Sherwin-Williams finished.

Sparton officials picked six coded cabinets. All were S-W finished.

With S-W furniture finishes and minor changes in technique, Sparton gets 25% more cabinets per day with the same number of men. They get better build, better clarity, depth and shrink resistance. They have eliminated one spray operation and one sanding, cut sealer material cost by nearly 40%—even though costlier formulations were used. And they get more attractive cabinets in the bargain!

What Sherwin-Williams finishing men and materials did for Sparton might be done for you. It costs nothing to consult a representative of this world's largest paint manufacturer. Sherwin-Williams Company, Cleveland, Ohio, and all principal cities.

SHERWIN-WILLIAMS

INDUSTRIAL FINISHES

Bleaching Magnolia

Can you give us the complete information necessary on the proper method and applications for the bleaching of such woods as magnolia, gum and maple, to obtain the even "all-over whiteness" essential for turning out work in the so-called modern or blond finishes, made from these woods?

Are these bleaches applied by brush or spray (or both)? Are they injurious to the workers' skin and clothing? Do they raise the grain of the wood? Is it feasible to bleach by dipping wood pieces before assembling?

Any information you can give us along this line, or any recommendations, will be more than appreciated.

We believe that most of your questions can be answered by reading several articles on this subject in back issues of INDUSTRIAL FINISHING magazine. These were written by men who are familiar with bleaching materials and their use.

You will notice, from the information given in these articles, that bleaching materials, as a rule, are injurious to the skin and for this reason workmen are generally obliged to wear rubber gloves.

Bleaches are usually applied by sponge. They would soon ruin an ordinary brush—although there are special fiber brushes made for use in applying bleaching compounds. A few concerns make a practice of spraying the bleaching material on, but we understand that this should be done in a separate spray booth or in a spray booth that is kept scrupulously clean. If over-spray from bleaching material is later covered with over-spray from varnish or lacquer, you are liable to have a fire as a result of spontaneous combustion.

Bleaching materials usually raise the grain of the wood (not so much with maple) because the solution is wet. As a result, the wood surfaces must be lightly sanded after the bleached wood becomes dry.

In reference to dipping wood pieces in bleaching compound before assembly, we have never heard of this being done. It might be possible, but it occurs to us that it would probably be wasteful of bleaching material. After all, isn't the face wood all that you care to have bleached for a blond finish?

For further information we are referring you to some of the manufacturers of bleaching compounds. They are specialists in this work and can give you specific and authoritative information — and perhaps run some performance tests for you.—ED.

Spray Booth Fire Hazard

One of our customers has raised the question of whether or not the fire hazard is increased when both varnish enamels and lacquer enamels are used in the same spray booth. So far as our experience is concerned, this is not true, but we would like to have the benefit of whatever information you can give us on the subject.—O. L. Co. (Finishes).

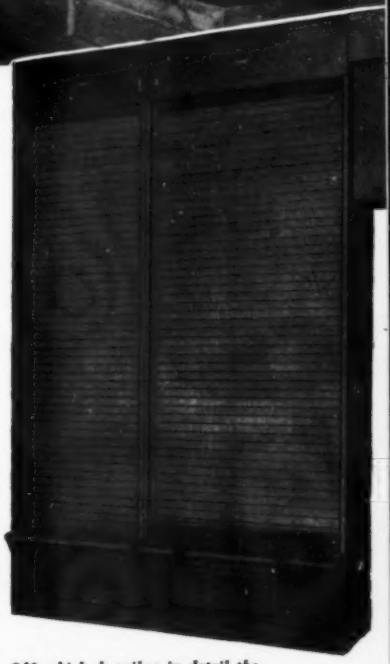
Yes, this is a hazard according to the experience of practical finishers. As one foreman expresses it, "Lacquer gets hot under varnish; and bleach overspray gets hot under either lacquer or varnish". In other words, if the film or dust of overspray from lacquer spray work is later covered with a film of overspray from varnish or oil enamel you have a condition

Today's FINISHING ROOMS DEMAND A CONSTANT UNIFORM VOLUME OF CLEAN AI

The more general use of thermoplastic finishes, such as are used extensively on refrigerators, stoves, and automobiles, demands dust free finishing rooms supplied with a constant uniform volume of clean air in excess of the volume exhausted by the spray booths.

Only high efficiency air filters can perform this service, and the American Automatic Self Cleaning filter has proved most practical because of its ability to maintain a constant uniform air volume with a minimum of attention.

There is a complete line of AAF filters for all product finishing needs. Write for descriptive bulletins.



American Air Filter Co., Inc.

Incorporated

247 Central Avenue, Louisville, Ky.

AMERICAN *Automatic* AIR FILTERS

Send for Bulletin No. 241 which describes in detail the operation of the American Automatic Air Filter.

which may cause spontaneous combustion, followed by a disastrous fire. And the same goes, we understand, when the overspray from certain bleaching compounds is later covered with overspray from lacquer, varnish or oil enamels.

Experienced finishers are careful about this and make it a point to spray these materials in different booths, or they clean the booths before changing types of material. —ED.

Wood Graining

I have noticed in your INDUSTRIAL FINISHING magazine, at various times, some information about graining lumber. We would like to get some data on this if we can. What we have in mind is whether it is possible (and what the method might be) to change the grain, for instance, of Northern Michigan grey elm to make it appear more like oak, and also if you think this can be done on material such as Pondorose pine.—O. C. Co. (Church Furn.)

We presume you know that there are several methods and several different types of equipment for doing this work.

One of the methods which has been used successfully and extensively for several years involves the use of an etched copper plate which is inked, the surplus ink scraped off, and the remaining ink picked up with a composition roller which is used to transfer the ink, in printed pattern, to the ground-coated wood surface. After the grain has been printed on the wood and has become dry, the surface is finished in the usual way—that is, with clear lacquer or clear varnish.

Several articles about this method have been published in INDUSTRIAL FINISHING, and manufacturers of the equipment and materials used advertise in every issue of this magazine.

The silk-screen stencil method of wood-grain production has been vastly improved and offers interesting possibilities.

Also, there are the grain-printed lacquer films, the printing of wood grain from transfer paper and decalcomanias, and the spraying of grain pattern through special stencils.

As a matter of fact, there are so many methods and facilities available for graining by mechanical process that an illustrated book could be prepared on the subject—but we know of no such book.

We are referring a copy of your inquiry to several concerns that manufacture and sell equipment for graining wood and we feel sure that they will promptly acquaint you with what they have to offer. —ED.

Overspray Breaking Into Blaze

On page 78, of May 1941 issue of INDUSTRIAL FINISHING, you have an article captioned: "Overspray Breaks Into Blaze".

Some years ago a spray-booth lining was developed for Grigsby-Grunow, former radio manufacturers. As you will recall they were large operators, having some 200 spray booths. They had a great deal of trouble with fires started by static. Undoubtedly the condition described in your article is of the same origin. I used to prepare a compound that corrected their trouble and I still have the formula. I am positive it will remedy this trouble easily.

The compound is a paste that is thinned with water. It is applied to

INDUSTRIAL FINISHES
to Enhance the Appearance
OF EVERY SURFACE
Specially Made for All Processes
Including ROLLER COAT • GASKET DIP
TUMBLE • SCREEN PROCESS

JAMES B. DAY & CO.
CHICAGO

FINE FEATHERS

MAKE FINE BIRDS

A surface coating of fine Rayon Flocks on your product has the same effect as fine feathers on fine birds—viz: Smooth lustrous surface, and beautiful color and sheen that attract attention.

Result — increased sales with increased profit to you, because a small quantity of flocks covers a lot of surface at very small cost. For really fine quality

Cotton, Wool or Rayon

FLOCKS

just write to Claremont for color card and samples.

CLAREMONT WASTE MFG. CO.

CLAREMONT, N. H.

The country's largest makers of quality flocks

the walls of the booth with a coarse brush or trowel, and is put on at least ⅛-in. thick. It dries in six or eight hours, forming a loosely textured white plaster. After each day's work the operator can brush down the day's accumulation of overspray and sweep it from the booth. The outside exhaust outlet can also be treated in the same manner. A week's accumulation of overspray of the powdery type is enough to kill the operator when it flashes. A coating of this safety lining will last about three months. A certain amount of it is brushed away with each day's brushing.

I am in position to make up and supply quantities of this material to anyone interested.—C. W. McN.

Frolics in The Finish Room—2

MATERIALS such as lacquer, sealer, shellac, varnish, thinner, rubbing oil and naphtha are usually kept in a fireproof building outside of the main manufacturing plant. When materials are needed for various operations, a man is kept busy delivering, in 5-gallon containers, the materials called for service.

On this particular occasion the rubbing foreman asked for delivery of five gallons of rubbing oil. The

man delegated to deliver the oil (just for a practical joke) delivered a 5-gallon container of heavy rubbing varnish instead of the oil called for. Without trying or smelling the material in the container delivered, one of the rubbers filled his small pan, which he uses on his bench for mixing pumice stone with rubbing oil.

Still not realizing that he had varnish in the pan, he dipped his rubbing block into it and then applied it to the surface of a dresser top to be rubbed. He did not take over three strokes until the block became very sticky to the surface. Then he realized that a trick had been played on him—or a mistake had been made in the delivery of the containers.

Such jokes or mistakes are very costly to the manufacturer, not only in the waste of the varnish but in the time spent cleaning up the mess and finally refinishing the top of the dresser.—F. W. WORTH.

More About Mechanical Graining

Here is some additional information about mechanical graining as first described for your readers by William F. Hyde, in the April issue of your magazine.

Being the first user of this device, Mr. Hyde suggested that I might pass some added information on to you, that you may use for the benefit of your readers.—W. B. L.

IN PAST years the graining process was limited in its usage because it had not been made adaptable to high production and low-cost practice. Graining by hand and by the use of various types of hand rollers limited the process to a smaller field.

WAX FREE

NON-INFLAMMABLE

REMOVER

- Quickly removes all kinds of finishes and coatings.
- Saves time, labor and material.
- Easy to apply—no after cleaning.
- Doesn't raise grain nor discolor.

SPECIAL OFFER 1 gal. testing sample at drum price F. O. B. Newark, N. J.

(Also manufacturer specially formulated non-inflammable coatings.)

INDUSTRIAL CHEMICAL DEVELOPMENT CORP.

331 MADISON AVE. NEW YORK, N. Y.

A Superior Varnish for Fir or Gumwood

RX-239 SPEED - DRY VARNISH

A vastly improved, production-proven clear gloss varnish. Dries in 2-3 hours even in cold weather. A single spray coat provides the build and appearance of 2 coats of ordinary varnish.

For economy as well as for faster production, you will find that one coat of our special lacquer sealer followed by one coat of SPEED-DRY VARNISH is an unequalled combination for spray finishing fir or gumwood.

MARTIN VARNISH CO.

900 WEST 49TH PLACE

CHICAGO

OUT ON A LIMB?

Having any trouble in getting the grade of veneer you want at a pre-war price? Or do you have to take veneer a little too dark?

Very economically Kenwood Custombleach will remove any amount of unwanted color and give all veneer a new lease on life. If you would like to bring any kind of veneer up to your own individual standards, write to

Kenneth O'Meara

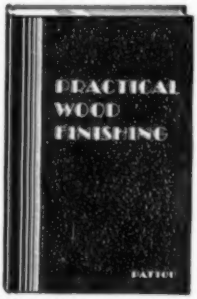
KENWOOD BRANDS LABORATORY

Asheville, N. C.

PRACTICAL WOOD FINISHING

The Most Complete Handbook On Finishing Fine Woods Ever Written

Tells EVERYTHING you need to know about Wood Finishing. Includes types of unfinished furniture, choice of finishes, brushes, accessories, precautions, natural finishes, staining, filling and bleaching, varnish, enamel or paint finishes, finishing with a spray gun and many other fascinating practical subjects. Also includes complete section on furniture repairing and refinishing. Four pages of 32 different foreign and domestic woods illustrated in natural colors. 112 pages fully illustrated.



CLOTH, POSTPAID $1.25

INDUSTRIAL FINISHING

222 East Ohio St. Indianapolis, Ind.

Through the use of a mechanical graining machine, such as that described and illustrated by William F. Hyde in the April issue of INDUSTRIAL FINISHING (pages 16-18), the entire graining process may be placed upon a production basis wherein 1000 or more units a day, depending on the various sizes and shapes, may be processed easily and inexpensively.

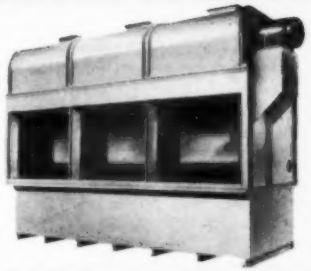
This device (the mechanical graining machine) mechanizes the graining process on the same principle that a conveyor system mechanizes different finishing processes, except that in the latter the objects being finished are moved by conveyor, while in mechanical graining the graining roller moves up and down a track, first picking up the grain impression from the graining plate and then passing over the object being grained. In this method, with the mechanical scraper for cleaning the roller, the operator does not touch or handle the roller during the entire process.

Graining has been expensive too, in that the graining rollers used in wood graining were easily cut and damaged. Heretofore most graining has been done with gelatin-covered rollers to transfer the print from the graining plate to the object being printed. The use of such a roller necessitated changing the composition for summer and winter, as gelatin is subject to hardening in cold weather and softening in warm weather. In other words it is customary to use a harder gelatin roll in summer time than during winter.

These difficulties have been entirely eliminated through the use and development of rollers made of synthetic rubber. This material, when properly adapted, is impervious to climatic changes and will not cut or mar, as is so with gelatin.

ONE of the specialized designs of Spray Booths using the INDUSTRIAL HYDRO-WHIRL

Here it is used for spray painting magnesium alloy castings in a large motor car plant. The Hydro-Whirl was chosen because it affects a sure and economical means for removing pigments from paint-laden air.



No paint can pass through the constant "water whirl" action—all "air holes" are stopped the full length of the booth. Maintenance reduced because no eliminators to clean.

Investigate the many adaptations of Hydro-Whirl; discuss your paint spray problems with our engineers.

INDUSTRIAL SHEET METAL WORKS
Manufacturers of Hydro-Whirl Spray Booths and Dust Collectors, Industrial Ovens, and Ventilation Systems
626 E. FOREST AVENUE • DETROIT, MICH

Through the use of the mechanical graining machine the entire process is done by only two operators. One operator places the object to be grained on the far end of the graining table and removes it after the roller passes over it. The other operator inks the graining plate with a steel scraper and releases the clutch of the motor, which starts the roller down the track, picking up the grain impression from the plate and impressing it on the object being grained.

The stop at the end of the track automatically trips the clutch and starts the roller back to the starting position where the operator prepares it for the next impression by applying the roller scraper to the rubber and scraping it clean.

While this type of equipment is best suited for graining flat surfaces it is by no means limited to that type of work. By lowering or raising the table on which you are graining, you may grain objects of different sizes and shapes.

The use and development of this equipment will, I believe, be a great step forward in making the graining process available to manufacturers who have found it too expensive and too slow to employ graining of any sort in the finishing of their products.—WILLIAM B. LEVY.

Wood Bleaching Bulletin Free

A new illustrated bulletin that calls attention to the merits of "Blanchit" and gives detailed directions on how to use this 2-solution bleaching compound on furniture, woodwork, fixtures and floors, has just been issued by L. R. van Allen Co., 408 N. Wells St., Chicago, Ill. "If you do bleaching you need this bulletin"; copies are available on request.

Here's

PROTECTION

that cuts your finishing costs!

Mar Proof on your product assures **protection** against common nicks and scratches —assures fast finishing with fewer repairs! . . . And it gives lasting beauty to your product! Mar Proof Lacquer dries quickly to a smooth transparent finish on maple, gum, mahogany and other cabinet woods. Made in Clear Gloss and Satin Finish. . . One test will prove it's the **right** lacquer for your product!

Mar Proof Lacquer Sealer is recommended for first coat.

THE SCHAEFER VARNISH CO., Inc.
Louisville, Ky.

Test "Mar Proof"

Send for FREE Samples!

Schaefer's MAR SPROOF LACQUER

"SPEED-BLOC Sander Has Speeded Up Production—Cut Costs 40%"

—THE TELESCOPE FOLDING FURNITURE CO., INC.
GRANVILLE, N. Y.

"Speeding up surface preparation has helped us set up faster production schedules, thanks to the Sterling Sander. In addition, it has cut costs 40%."

Savings up to 75% on labor and abrasives . . . better, more uniform finishes in a fraction of the time . . are reported by Sterling users everywhere. This modern, high-speed sanding equipment sands flat or curved surfaces—wet or dry—metal, wood, or composition. Feathers spot jobs, sands filler coats. It's easy to operate—quickly mastered by unskilled help. Soon pays for itself through its savings.

WRITE FOR FULL DETAILS.

One Hand Does the Work of Three!

Sterling
TOOL PRODUCTS COMPANY
359 E. OHIO STREET CHICAGO, ILL.

Use Good Bleaches

IT HAS come to my notice that a few furniture manufacturers have obtained formulas for mixing up certain chemicals intended to bleach the color out of wood previous to finishing same. In itself, this is not to be condemned if it is to the best interests of the furniture manufacturer to employ these formulas.

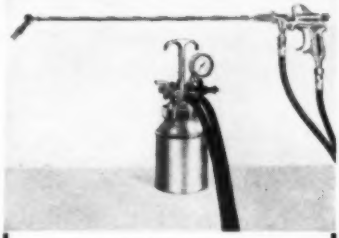
However, some of these chemical mixtures can and do cause trouble in the finishing process. They also endanger the health of the men sanding such bleached furniture. This is due to the fact that certain formulas for the home-made bleaches call for the use of sodium silicate.

The theory behind the use of this material is principally that after the bleached wood surface has dried, there remains a dead white coating of sodium silicate on the wood, thus lending an appearance of effective bleaching. Sanding this material is difficult and costly and will pulverize the sodium silicate, while at the same time rubbing it into the wood structure. This causes the wood to appear bleached whereas it has been pigmented. A thorough washing of the sanded and supposedly bleached wood surface will convince anyone that the sodium silicate often deceives the bleacher.

Sanding the wood surface coated with sodium silicate causes finely powdered silicate to pass off into the air which the sander breathes. Constant exposure to this dangerous dust will inevitably lead to serious lung inflammations and a complicated irritation of the respiratory system. A furniture factory need not be a breeding ground for silicosis.

After the wood surface has been prepared for finishing there still

HARD TO GET AT?



Use our standard G-6 spray gun fitted with a swivel head extension nozzle, operating from a one- or two-quart tank with control head.

Let us know your problem.

Send for Catalog 77.

EclipseAirBrushCo.,Inc.

392 Park Ave. Newark, N. J.

Power Graining Machine

1. Cycle time 25 seconds.
2. Will cover a surface up to 31" x 80".
3. Automatic roll cleaner.
4. Cuts production costs.

AMERICAN RICHWOOD PRODUCTS CO.
(FORMERLY AMERICAN ELECTROTYPE CO.)
Graining Plate Division
104 E. MASON ST. MILWAUKEE, WIS.

Now — Eye Protection, too!

SR-151 Eyeshield Respirator

The efficient R-151 Chemical Respirator protects lungs against fumes—the cellulose-acetate Eyeshield protects face and eyes against particles or splashes. Full vision eyeshield fits snugly, comfortably; non-fogging, non-inflammable; easily removed. Order as SR-151. Get details.

PULMOSAN SAFETY EQUIP. CORPORATION

Dept. IF, 176 Johnson St., Brooklyn, New York

NATIONAL PAINT DICTIONARY

1940 — $5.00

More than a Dictionary—an Encyclopedia. This is the most complete work of its kind now available. It includes definitions of trade names of raw materials used in the Paint and Allied industries—also charts, tables, useful information and miscellaneous data to which you can refer often. It describes all the important testing devices and apparatus used in the laboratory, together with illustrations and is strictly technical, thoroughly authentic and completely unbiased.

INDUSTRIAL FINISHING

222 East Ohio St. Indianapolis, Ind.

remains the sodium silicate which has been sanded into the wood itself. Unhappily this material will cause trouble with the finishing materials commonly used, and it is a cause of bleached furniture being returned.

Since sodium silicate is not readily soluble, when dry, in water, it cannot be entirely removed from the wood. With all precautions that can be taken, there still remains enough of this material in the wood to be a constant menace to the permanence of the finishing coat and the stain colors in the wood.

To sum it up in a few words, I believe that the use of sodium silicate should be actively discouraged. It is a monetary and time loss to the manufacturer. It endangers the health of the sander who breathes the dust from wood treated with sodium silicate solutions. It nullifies the whole effort put forth in finishing the piece of furniture. It is a pigment masquerading as a bleach and its transitory appearance of color removal is soon dissipated by time.

The company that manufactures a material intended solely to bleach wood is prepared to stand behind its product and to be of tangible help to the men using its materials. Since all wood bleaches are highly corrosive materials it is not good judgment to place chemicals in the hands of an unskilled mechanic and tell him to do the job of preparing the chemical solution, which should properly be under the supervision of a trained chemist. Any mistake on the part of the mechanic is not only costly to the manufacturer but will destroy the value of his entire piece of furniture. Should the mechanic preparing these corrosive materials have an accident, it can easily prove to be dangerous.

Wood bleach, as it is today,

DEFENSE CONTRACTS

MAY REQUIRE THESE APPROVED SEA-LAC FINISHES

Manufacturers working on defense contracts, the specifications of which include lacquer enamels, will be interested to know that SEA-LAC Lacquer Enamels meet our own high commercial standards for industrial finishes, as well as meeting the requirements of the U. S. Army Specifications such as those listed below. Write for details.

SPEC. No. 3-162A Lacquer, Enamel, Nitrocellulose, and Thinners.

SPEC. No. 3-150 Lacquer Enamel.

SPEC. No. 197-54-144 Lacquer Enamel.

DURALAC CHEMICAL CORPORATION

90 LISTER AVENUE **NEWARK, NEW JERSEY**

should not be made in a furniture factory by men who do not understand the nature of the materials they are dealing with, any more than a factory should attempt to make its own turpentine or varnish.

The reputable manufacturer of wood bleaches understands these various factors and his sole interest is in being of service to furniture manufacturers, whether large or small. He can be depended upon to place into the hands of the furniture manufacturer only such materials as have been developed and proved to be of a real help to the manufacturer of furniture. Since he is a specialist in preparing wood finishing materials and combines chemical knoledge with actual furniture manufacturing experience, he is the one most fitted to be of service to the furniture manufacturer.—KENNETH O'MEARA.

Care of Finished Furniture

FACTORY-MADE or hand-made, no piece of furniture is ever really "finished" in the sense that the surfaces can be forgotten once the wood pores have been filled and a soft lustrous sheen developed.

Experts all insist that woods need to be fed with oil occasionally to prevent them from deteriorating. Otherwise the parts of a piece of furniture will become loose in time, the wood will warp and crack, and the veneers will get loose.

I recommend the application of a furniture polish at least twice a year on varnished and oiled furniture. You can purchase good polishes or, in an emergency, you can prepare something suitable by mixing two thirds boiled linseed oil with one-third turpentine. The linseed oil "feeds" the wood and the

turpentine helps the oil to penetrate the surface of the wood, and it loosens the dirt. Apply it to the furniture with a soft cloth, wipe off all excess polish with a clean cloth, and then polish the surface by rubbing it with the grain of the wood until the surface is thoroughly dry and until your fingers leave no marks. This polish removes all dull foggy appearance from furniture.

* * *

To clean the surfaces of furniture that are badly soiled, wash them with a mixture composed of one quart of hot water, three tablespoonfuls of boiled linseed oil, and a tablespoonful of turpentine. Keep the mixture hot in a double-boiler while using it. First, wash the wood with a soft cloth wet with the solution; then polish with a dry cloth. If desired, furniture polish may also be used.

An excellent surface duster for daily use may be made in the following way: Pour into a glass jar two tablespoonfuls of furniture polish or liquid wax. After the entire inside of the jar has been coated, pour out the remainder of the mixture and place a piece of woolen cloth in the jar. Let it stand for a day or two until it absorbs the polish evenly. When the dust cloth becomes soiled, it should be washed and the process repeated. Such a dust cloth should not come in contact with wallpaper, as it will leave an oil spot. By using this process you will find that furniture will remain in better condition and will not take on that dirty foggy sheen that we often see on the surfaces from usual service.—F. W. WORTH.

TO THE FURNITURE MANUFACTURERS WHO COOPERATED . . .

So patiently with us while WEAR MASTER SPEED-DRY FILLER was being perfected by our expert wood finishers, we extend our sincere thanks.

To furniture manufacturers who wish to avail themselves of the advantages of a wood filler that dries for sealing coat in less than an hour—that works equally well under your present finish coatings, we offer vital reduction in production costs and considerable saving of time required to move finished furniture off the floor.

Available in all shades of Walnut, Mahogany and Oak.

Write us NOW telling us the kind of wood you are using and the type of furniture you finish, so we can advise you what you can expect to gain when you start using WEAR MASTER SPEED-DRY FILLER.

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EVANSVILLE, INDIANA

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FLOCK

The use of flock solves many perplexing finishing problems. Selective for material, color and quality, flock is easily applied, and lends itself to numerous effects, both protective and decorative. Let us tell you how it can be used effectively on your products.

*RAYCOTE *KINGCOTE *SPANGLES *RAYMIX

Send for samples. *Dealers wanted.*

Rayon Processing Co., 862 Tremont St., Central Falls, R. I.

Shellac's Wearing Qualities Shown by Tests

A new and colorful 4-page brochure shows the results of actual service on maple, oak and pine floors finished with shellac, as compared to the same woods finished with three other types of floor finishes. An interesting story is presented of how the tests were made and what the results revealed. Write the Shellac Information Bureau, 70 Pine St., New York, N. Y., for a free copy.

A Train of Striking Color

A new streamlined day train colorfully decorated and named "James Whitcomb Riley" has been placed in operation between Cincinnati and Chicago on the New York Central system.

Henry Dreyfus, well known industrial designer, streamlined the locomotive, mail, dining and observation cars in collaboration with New York

New York Central's "James Whitcomb Riley", named in honor of Indiana's Hoosier poet. Photograph, courtesy of Sherwin-Williams Co.

Central engineers in the System's Beech Grove shops, while the Budd Co. turned out the Riley's four stainless steel coaches.

The fast, dark-gray Pacific-type locomotive has striking red driving wheels and trim, and the various cars are joined by a vermillion window band superimposed on a gray background with silver stripes.

The diner is in three sections with banquette seats in the center, upholstered in blue leather. Floor coverings and drapes in this car are in varied tones of tan and rust.

The observation solarium car is done in tan and walnut, with upholstery of rust and blue. Interior windows divide the car into three sections, with a semi-circular bar in the center. The coaches are painted in soft blue, silver and gray tones, and seats are upholstered in rust and maroon.

EVER HEAR STIX TALK? LISTEN . . . .

MR. STIX

I'm a Lacstix. I come from a long line of stix. I am made of the finest materials and only the best materials go into me. I don't have any color specks like a trout. I am pure. I do not puff or lift up when they throw lacquer or liquor on me. That's why finishers like me. I've got 2 brothers, Shelstix and Cementstix, and a smaller brother, Special Cementstix. Also, a sister, Porcelstix. We are known as the only perfect specimens of burn-in-stix. Our lives have been watched and guided by competent chemists and our home is Finishine Laboratories, Inc. We come in 155 different colors. The best way to apply us is with Finishine's N *No. 2* "ELECTRO-KNIFE." How about sending for free instruction catalog card Book on Finishing, which has actual sample buttons for testing?

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Presenting BOTH SIDES of the PAINT MASK Story!

BEHIND this mask . . your paint spray men are more efficient, more comfortable, safe, contented . . better able to do a better job.

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CHOICE OF 3 MODELS . . . .

Large Plastacele Window affords wide working vision. Hood attached to cap fits snugly over shoulders. Air tube for compressed air connection if desired. Made in Light Weight Muslin (No. 687); White Rubberized Cloth (No. 688); and in Heavy Khaki Cloth (No. 689).

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H. C. Reed with Jones-Dabney Aviation Finishes Division

The Jones-Dabney Co. announces the appointment of Mr. Herbert C. Reed as manager of its Aviation Finishes Division.

Mr. Reed is a graduate of the University of Kansas, and holds an A. B. Degree in Chemistry. He is well known in paint circles, especially in the Detroit area, where he has been located for the past five years. He is a Past President of the Detroit Paint and Varnish Production Club and has been active on the Technical Committee of that Club for several years.

Jones-Dabney's Aircraft Finishes Division, both developmental and manufacturing, is located in Malden, Mass.

Bulletin of Air Filters

A small bulletin that illustrates and describes several types of "Protectomotor" air filters—filters for compressors, compressed air lines, engines, spray booths and ventilating apparatus—can be obtained by writing Staynew Filter Corp., Rochester, N. Y.

Letters from I. F. Readers

(Continued from page 3)

Naturally, the information contained in the issues for 1929 and onwards is by this time obsolete. Doubtless these manufacturers have issued booklets at later periods and we would be very grateful if you could see your way clear to obtain as many of this type of publications as possible and forward them to us, or you may be able to influence the different manufacturers to forward us a copy of their publications direct and so save your inconveniencing yourself further.

We were particularly interested in the series of articles by Mr. Dennis O'Brien and Mr. Geo. A. Endom in the 1929-30 publications.

We are manufacturing nitrocellulose lacquers and synthetic enamels in Australia, and your publication, which we have received from time to time, has been of great assistance to us.

We would be very grateful if you could see your way clear to do this favor, being particularly eager to get into the aircraft business and do our bit toward the war effort.—L. S. Ltd. (Adelaide, S. Australia).

We are asking some of the American manufacturers to send you their latest booklets about aircraft finishing.—ED.

Rubbing Compound

Could you furnish us the names of firms who make a rubbing compound to be used with rubbing oil, which, after a piece has been rubbed and the oil has dried out of the compound, does not show up in the carvings, small creases, etc.?

Our finishes are mahogany and walnut, and the compound we are now using shows up in the carvings, etc., after the oil has dried out, showing the color of the original compound, and it is difficult to get this out.—F. F. Co. (Dining Room Furn.).

We have in mind a "Dri-Dark" rubbing compound, which has been publicized in this magazine, and we are giving you this manufacturer's name—along with a few others who may have what you want.—ED.

Gold Plate Finish

We are now using a gold powder mixed with a French varnish. When sprayed on metals, wood and plastics, the finish is almost like gold plating; but we find that when this is applied on our merchandise it does not air-dry rapidly enough nor does it have the adhesion required. We have tried various bronzing lacquers but they do not give the same effect as varnish. If

you can suggest any other material to substitute for the varnish it will be greatly appreciated.—D. Art Co.

We are referring you to some of the manufacturers of metallic finishes who, we think, can supply you with a satisfactory material for your work. —ED.

Spray Booth Coating

In the August, 1940 edition of INDUSTRIAL FINISHING, we note, in the Question & Answer Column, the editor mentions a material called "Kelsanite" to be used for coating spray booths. Won't you please give us the name and address of the manufacturer? Also, other spray-booth coating manufacturers, if convenient?—T. A. Co. (Wire and Metal Novelties).

Information supplied.—ED.

Reclaiming Solvents

One of our good customers has about 3,000 gallons of used lacquer thinner and oleum spirits mixture that he would like to either sell or have reclaimed. We used to be familiar with some concern in New York that buys such merchandise as this, but have lost the address and we are wondering whether you might be able to help us by forwarding us the names of one or two of such companies, either in New York or in the middle west.—A. U. Co. (Automotive Finishes).

Advertisers in INDUSTRIAL FINISHING —Solvents Recovery Service, Newark, N. J., or Hammond Chemical Service, Hammond, Ind.—can take care of this for your customer.—ED.

Heat Resistant Finishes

We are in the market for a heat-resistant finish on sheet metal—one that has a pleasing appearance and a considerable degree of luster. If an aluminum type of material, which has the appearance of polished chrome plate, is available it would be satisfactory.

We also might consider ash-tray lacquers, mention of which we have observed in your magazine a number of times. We are particularly interested in a jet black or medium blue finish with a high luster, which will withstand a considerable degree of heat.

We would also consider the chemical coloring of steel, if this is available in a pleasing appearance.

If you have any information on the above or can give us the name of the manufacturers handling such items, we shall appreciate it very much.—R. E. Co. (Research Laboratory of Stove Mfr.).

One Coat Finish on Maple Chairs

In looking over your April 1941 issue, page 8, I came across an item entitled "One Coat Finish on Maple Chairs?". Can you furnish me with the manufactuer's name of this product? Any information you can give me in this matter will be greatly appreciated.—A. H. H.

We regret to admit that we have not yet learned what concern, if any, supplies such a finish. Can some reader please tell us?—ED.

Sprayable Adhesives Available

We note in April issue of INDUSTRIAL FINISHING, page 80, a request for a sprayable adhesive with flexible possibilities. We manufacture over 500 different adhesive formulas, the majority of which may be sprayed. A large research and service laboratory is maintained by us to give individual attention to any client's requests . . . .— Minnesota Mining & Mfg. Co.

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DESPATCH OVEN COMPANY

MINNEAPOLIS MINNESOTA

Industrial FINISHING

Distributed monthly to finishing room and paint shop foremen, production superintendents and company officials of metalworking, woodworking and miscellaneous industrial plants where production finishing is a major operation in parts and products manufacture.

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Published the 18th of each month by
PRACTICAL PUBLICATIONS, Inc.
222 East Ohio Street, Indianapolis, Ind.
Telephone.....Riley 6771

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President.....A. T. Gaumer
Vice Pres. and Editor.....W. H. Rohr
Secretary.....R. E. Suits
Treasurer and Adv.-Mgr.....E. A. Dosch

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Subscription Rates per Year
U. S. and Possessions.....$2.00
Canada and Foreign Countries.....$3.00
(No subscription solicitors are employed)

Editorial

Many Finishing Room Problems but Few Men to Solve Them

Your Editor writes this from first-hand observation. Having had occasion recently to visit a city the size of Indianapolis in the great Southwest, I spent a little time calling on a few factories that use finishing material on a production basis—concerns that manufacture furniture, Venetian blinds, showcases, fixtures, garment hangers. They have many problems but few competent manufacturers' representatives to call in to solve them. I was surprised at this because here is a city of abundant wealth and several factories that use considerable quantities of finishing material, equipment and supplies.

Just to review a few of the highlights: One furniture manufacturer is interested in a conveyorized force-drying system for speeding up the drying of his finishes. Also, this concern is abandoning the use of aluminum paint for dip-coating bed springs and is going back to colors. The company is interested in information about flow-coating or some means by which they can coat bed-spring assemblies without using such large deep tanks of material, as in straight dipping. This manufacturer, by the way is using an excellent flow-coating outfit for staining and filling chairs.

One of the showcase fixture companies is having trouble bleaching certain woods. The company has used well-known bleaching compounds but these materials were purchased through a company other than the manufacturer. Apparently the printed directions accompanying these materials would not exactly apply to certain conditions which prevail at this particular establishment. Obviously, the user needs direct contact with the manufacturer of bleaches.

An executive in another showcase-fixture factory pointed out two 14-ft. spray booths and declared that the company learned by experience that booths of this size were needed in their work—after trying to get along with the 7-ft booth which a local manufacturers' representative had recommended and installed some years previously.

A Venetian blind manufacturer, at the peak of his season, was be-

ing slowed up by trouble that suddenly developed in the enamel he was using. He was buying prime-coated slats from California and had been getting along fine with a certain brand of enamel. Suddenly he found that the enamel wasn't drying properly. Coated surfaces appeared rough and remained tacky for 24 to 36 hours. In some cases blisters appeared. He thought that possibly the enamel manufacturer had started using some different solvent in the enamel and that this strong solvent was attacking the prime coat. Fortunately, in this case, the finish manufacturers' salesman was in the city and was prompt to cooperate with his customer. However, the difficulty had not been solved at time of my visit.

A garment hanger manufacturer was interested in many things—natural wood finishes that wouldn't sink in, pastel colors that would remain uniform in color and give a smooth non-blistering one-coat finish on wood, a conveyorized dip-finishing force-drying system for wood hangers, the same for iron-wire hangers, a satisfactory low-priced one-coat metal finish, infra-red drying, etc.

These finish users get a great deal of information from INDUSTRIAL FINISHING Magazine, but they miss the splendid service that so many Northern and Eastern manufacturers get through quick direct contact with well-trained manufacturers' representatives and engineering staffs. It occurs to your Editor that possibly here is a fertile and profitable field for aggressive manufacturers of finishing materials, equipment and supplies—if they can spare experienced well-informed representatives to call on this trade. Possibly there are other localities that are in need of more effective service—and which offer profitable possibilities.

Plastics to Replace Some Metals Used Ornamentally

A number of manufacturers are studying various possible uses for plastic materials to free strategic metals for defense needs. Because of the heavy demand for aluminum, brass, copper and zinc and certain types of steel in the defense program, the possibility of replacing these metals in many consumer products with synthetic plastic compounds is commanding attention.

There is no shortage, either of plastic compounds or the raw materials from which they are made. The experience of many leading manufacturers in recent years has shown that plastics can be successfully used to replace certain cast or stamped metals in a wide variety of uses. A typical example is the growing use of molded plastic for housings of all types, notably for scales, business machines, radios, vacuum cleaners and other appliances.

Plastics also have replaced metals in some kitchen utensils, flashlight cases, measuring scoops, camera cases, automobile parts and many other consumer goods items which have used sizeable quantities of strategic metals.

A relatively new use in which plastics will replace large areas of thin-gauge aluminum and steel, so badly needed in aircraft production, is in electric refrigerators. Several companies now are introducing models in which extensive use is made of molded plastics for freezer doors, panel and drawer fronts, knobs and control panels.

A number of large manufacturers of plastic materials, both thermo-plastic and thermo-setting, have research laboratories to evaluate possible new uses for plastics in an impartial manner.

More About Finishing Salesmen

* An article appeared in the March issue of this magazine emphasizing the need for expert finishing salesmen. (Guest Editorial entitled "Better Informed Salesmen Are Now Calling on the Trade.") It states that the finishing business, like most every other kind of business, needs to be transacted on "a basis of friendship." But it also states that the day of doing business on a friendship basis alone is past; "that the only way to solid permanent sales cantacts can be made, is through a more technical approach."

I have been a finishing foreman in an active and wide-awake furniture factory for the past five years. As such, I believe myself qualified to further develop the ideas contained in the already mentioned article.

First of all, I agree entirely with the thought that "permanent sales contacts can only be made through a more technical approach." But it is still a known fact that all finishing salesmen do not use or follow that approach; certainly not until they have had several years of experience.

Many times I have wondered in amazement at the approach of finishing salesmen who have come to our plant to sell their products to me. I have spent considerable time with quite a number of them. I have taken them through our finishing department and acquainted them with the use of the products they were trying to sell me, because they were familiar with only the ingredients of their products and not their application. So I believe I have contributed definitely in developing finishing salesmen. Surely other finishing foremen throughout the industry have felt the same way and have given their time and information toward the development of finishing salesmen.

Therefore, if it is true that finishing materials can be sold on a substantial basis through a more technical approach, it follows that finishing foremen, particularly those with an aptitude toward sales, would make the best finishing salesmen. Personally, I have had a strong desire to become a sales representative of a firm dealing in finishing materials. Since all finishing materials are more or less alike, it is only sound reasoning to suppose that an experienced young finishing foreman with a desire, as well as the ability, to sell should be a top-notch salesman from the start.—J. M. J. (Finishing Foreman).

EDITOR'S NOTE: We believe that J.M.J. has made an interesting point in his comments about finishing salesmen and finishing foremen. It is where he speaks of the foreman taking a new salesman through the finishing department and explaining to him how his company's materials are used, what is expected of them, and what other conditions may affect such materials favorably or unfavorably. Foremen are to be commended for taking this interest in salesmen. Even well-informed experienced salesmen need to know the shop conditions, as well as other requirements, in order to intelligently prescribe what materials to use and how to use them for best re-

* Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

sults. This meeting and friendly exchange of information between the representative of the manufacturer of finishes and the user of finishes is the vitally important human contact between those concerns, and upon it depends the success of their business transactions.

Clear Out Poison Fumes With Adequate Exhaust

* During the past several years many finishing materials have been made less poisonous by changing formulas so as to eliminate or find substitutes for certain solvents, etc. But there are some materials that are still very toxic. Dangers to the health of workmen resulting from exposure to high atmospheric concentrations of these sprayed toxic materials creates a hazard that cannot be ignored by any factory manager or foreman finisher if he expects to attain maximum plant efficiency. No workman can perform the quantity and quality of work expected of him if he is continually breathing fumes from these more or less unpleasant poisonous materials.

Here is a hazard that every employer of finishers should be acquainted with. Ignorance of the hazard will not compensate for poor work nor the loss of the workman's health—or perhaps his death. Neither will ignorance of these hazards prevent expensive disability or death claims, which may be filed against the company. Not only is the health of spray men endangered, but the fumes may escape from the spray booth and spread all over the finishing room, thus menacing the health of other workers in the department.

Most of these health hazards can be removed by the use of adequate exhaust systems in the spray booths. Some furniture-factory owners spend thousands of dollars annually in buying new machinery and equipment for their machine rooms in order to step-up production, while their finishing foremen are trying to keep pace with the increased production and produce acceptable finishes with worn out, obsolete or inadequate spray apparatus and finishing-room equipment.

Management could spend up to a few thousand dollars for finishing room equipment that would remove the health hazards and it would more than pay for itself in savings affected in time and labor, and in the fact that it would enable the foreman finisher to produce a better finishing job.

An exhaust system adequate for removing the fumes and fine overspray from spray booths should be provided in every finishing room. Also, there should be plenty of room ventilation so as to insure a supply of clean fresh air throughout the finishing room at all times. Of course, a complete air-conditioned finishing room is the ideal thing, but many factory owners

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do not want to spend the money required to have this. However, plenty of ventilation can be had without installing an air-conditioning system, and at a nominal cost.

The amount of exhaust and ventilation needed in the finishing room depends upon the maximum quantity of material to be sprayed per minute, per hour, etc., the size of the spray booths and the size and location of the finishing room. This information can be obtained without cost from any concerns that manufacture spray equipment and air-conditioning apparatus, as all of these companies have engineers who are experts in this field. I am sure that money laid out for this equipment is money well spent.

In conclusion, I would urge every foreman finisher and his boss to try and ascertain whether these hazards are present in their finishing room; and if the hazards are present, even to a small extent, do everything possible to eliminate them.—H. W. CHESTER.

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Opalescent Colors

IN THE finishing of metal caskets, I have discovered that certain types of ready-mixed opalescent or metallic colors have merits that are important to the finisher. For example, if a metal surface has had contact with the perspiration from a workman's hand or with soldering acid, and if this area isn't carefully treated to neutralize that acid, it will bleed through certain finishes, but not through opalescent or metallic finishes made up with mixtures of aluminum powder and pigment. At any rate, this has been my experience.

Another point is that you can use part of the contents of a container of ready-mixed material, put the lid on and set the remainder aside for several days, after which it can still be used by stirring it and adding a little thinner if necessary.

Of course, if the National Defense requirements are such that paint manufacturers can't get the kind of aluminum they need for their formulations, then these materials which I like will be out of the picture.—F. HAGAN.

Record Disc Lacquer

SOME information about a black record lacquer for coating metal or paper discs which are to be made into phonograph records, includes the following:

On a typical test run, four coats were applied by dipping. Five minutes of drying time was allowed between the first and second coats; ten minutes between the second and third; and 15 minutes between the third and fourth. The final coat was allowed 15 minutes to dry before being handled.

These discs were dipped edgewise,

being supported centrally by a spindle held just above the top surface of the material, and rotated in the black lacquer at the rate of 5-r.p.m.

According to the manufacturer, there is a particular property about this lacquer that is especially desirable, namely the absolute freedom of needle noise during recording or when played back. Another feature is the fact that the shavings are fireproof. They do not take fire and burn in case someone should drop a cigarette in the machine while the record is being made.—F. C.

Infra-Red Heat From New Gas Burner

A NEW TYPE of gas burner, assuring complete combustion and giving off infra-red rays to assist in more rapid drying of finishing materials, has been introduced during the past year. It consists of a refractory disc which becomes white-hot within a few seconds after the gas is ignited under it, thus not only insuring the use of all available heat units in the gas and the elimination of foul fumes that might affect the finish, but generating infra-red rays in much the same way as the filament in an infra-red lamp—and eliminating the possibility of explosions that might result from incomplete combustion or from the gas flame being temporarily blown out.

It is said that the use of this burner will eliminate the dulling of the luster of urea-formaldehyde enamels in the presence of chlorinated degreaser solvents. The gas is premixed with the right proportion of air to insure complete and efficient combustion.

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Open-end air-curtain ovens can be used in connection with the burners to insure uniform temperature distribution and to reduce heat losses to a minimum. The burners are also adaptable to A-type ovens, vertical ovens and other types of installation. In addition to faster and more uniform bakes, the use of the burners is said to result in great reduction of fuel bills.—M. J. PEARCE.

To Remove Rust From Concrete

IF UNSIGHTLY rust stains left on concrete by pipes, steel window frames, iron table or machine legs, buckets, etc., are resistant to ordinary cleaning methods, they will often yield to the following glycerine-containing mixture.

Dissolve one part of sodium citrate in six parts of water and mix thoroughly with an equal volume of glycerine. Mix a portion of this solution with powdered whiting to form a paste that is just stiff enough to be spread on the stain in a thick coat by means of a putty knife or trowel. This will dry in a few days. After this, it should be replaced with a new layer of the paste or the first layer softened by adding more of the glycerine-containing liquid. Several applications may be required, but the results usually warrant the effort. Quicker results may be obtained by using ammonium citrate, but this substitution may be injurious to polished surfaces. — Glycerine Producers' Ass'n.

John F. Roche, Jr., of Binks Mfg. Co., Dies

John F. Roche, Jr., known to friends and associates as "Jack", died May 28, at Columbus Memorial Hospital, Chicago, Ill. His untimely death came as a result of complications which set in one week after an appendicitis operation. He was only 35 years of age. At the time of his death he was a director and vice-president of Binks Mfg. Co., of which his father is president.

Mr. Roche was born July 28, 1905, in Billings, Montana, and was the oldest of nine children. He was a graduate of the engineering school of Notre Dame University. He was very successful in building up the industrial division of the Binks Co. and traveled extensively by rail, automobile and airplane.

Mr. Roche is survived by his widow Elizabeth, and by three children, J. F. Roche III, Elizabeth and Patrick; and, of course, by his parents, two brothers and six sisters. He was buried at All Saints Cemetery in Chicago.

Lucite Plastic Reflectors

Protective reflectors molded of "Lucite" methyl methacrylate resin now are mounted on 500,000 automobiles in California, one of the first states to require reflectors on passenger cars.

Mounted from 24 to 42-in. above the ground on the rear of an automobile, the plastic reflectors flash a warning signal several hundred yards to approaching cars. These reflectors are doubly valuable in event of electrical failure, to which automobile accidents often are attributed.

Plastic reflectors of 3-in. diameter are said to reflect from eight to twelve times as much light as glass reflectors of 4-in. diameter. In addition, plastic reflectors are virtually indestructible.

Automobile reflectors molded from "Lucite" now are approved in 15 of the 16 states where approval is necessary, and the large reflectors for trucks are approved in all 37 states where approval is required. Thousands of these plastic reflectors are used on automobiles and trucks in states where approval of reflectors is not compulsory.

Plastic reflectors for trucks have become so popular that one manufacturer of these articles tripled his 1939 business in 1940, and in the first quarter of 1941 more than doubled his business over the same quarter in 1940.

"Lucite," a crystal-clear plastic, is said to lend itself to extremely accurate molding of the honeycomb of sharp-cornered prisms which flash back the rays of oncoming headlights. In addition, it is one of the few plastics that can be used successfully outdoors, and it is highly resistant to breakage. Reflectors molded from "Lucite" have been used in large quantities for roadside reflectors, route indicators, warning and directional signs and curve markers.

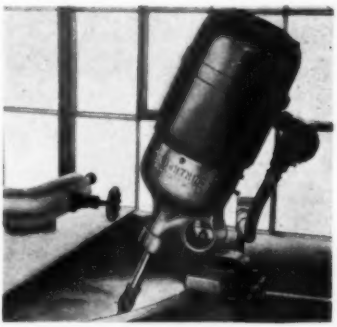
The Cotton House Exhibited

Nearly 700-lbs. of cotton have gone into the construction of the model "Cotton House" now in view in the patio of the Agricultural Administration Building in Washington, D. C. Sponsored by the Department of Agriculture, the house was designed as an example of low-cost housing, with especial reference to defense needs and with the end in view of affording another outlet for some of the nation's great surplus cotton crop.

Flame-proof fabric for the ceilings and the inside and outside walls of the house calls for the use of one-third of a bale of cotton. The fabric has been hot-pressed to fir plywood sections with a special synthetic resin adhesive, making a canvas-like surface ideal for any kind of decoration.

A new water-repellant, fire-resistant cotton insulation, Reyn-O-Cell, product of the Reynolds Metals Co., is installed in the ceilings and outside walls. More than one 500-lb. bale of cotton goes into the house in this form. Manufactured in strict accordance with specifications issued by the U. S. Department of Agriculture under direct U. S. Government inspection, the cotton insulation assures comfortable quarters in summer and permits more rapid heating of the house in winter, at considerably lower cost. The manufacturers say it is rated as one of the most efficient insulators by the American Society of Heating and Ventilating Engineers Guide for 1941, and also is being used as an effective sound deadening material.

The pre-fabricated ceiling, sidewall and floor sections make the erection of the house an easy operation, requiring only 62 hours of labor. A system of steel rods is used to tie the various sections together so that it may be demounted at will and re-erected wherever desired.



Direct Drive "LIGHTNIN" Portable Mixer used for maintaining proper consistency and suspension of pigment in a special enamel. Where colors vary frequently and quantities are not too large, this type of agitator can be conveniently changed from one tank to another.

KEEP PIGMENTS IN UNIFORM SUSPENSION AND REPLACE EVAPORATION LOSSES WITH A "LIGHTNIN" MIXER

With primer dipping tanks operating 24 hours a day, consistency must be constantly maintained in the quickest, most dependable manner . . the reason more "LIGHTNIN" Mixers are being specified than ever before.

The powerful "LIGHTNIN" Double Mixing Action drives pigments up off of tank floor and keeps suspension uniform. The complete bottom-to-top turnover plus a slow rotating which completely eliminates dead spots thoroughly mixes in thinner to make up for evaporation losses.

If you have a problem keeping pigments in suspension or keeping consistency uniform, consult us. Our specialized mixing experience is yours for the asking.

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With at least three to five years' experience as independent formulator of diversified nitrocellulose base industrial finishes. In application, state qualifications and salary desired. Replies held in strict confidence. Address TECHNICAL DIRECTOR, Roxalin Flexible Lacquer Company, Inc., Elizabeth, N. J.

GUARANTEED REBUILT SPRAY EQUIPMENT ON HAND AVAILABLE FOR IMMEDIATE SHIPMENT

14 DeVilbiss Q. M., 60-gals., double outlet, with safety valve, vent valve, air pressure regulator and air cocks. Hand operated agitator, $89.00.

10 DeVilbiss Q. M., 60-gals. Ditto, except with air motor agitator, $120.00.

1 DeVilbiss Q. M., 60-gals. Ditto, except with hand-operated agitator, $82.60.

1 DeVilbiss Q. M., 60-gals. Ditto, except with air motor agitator, $113.00.

8 DeVilbiss Q. M., 5-gals. Ditto, except with hand operated agitator, $38.50.

4 DeVilbiss Q. M., 5-gals. Ditto, except with air motor agitator, $70.00.

12 Binks "T", 10-gals. Single outlet, with safety valve, vent valve, air pressure regulator and air cocks. Hand operated agitator, $37.50.

8 Binks "T", 10-gals. Ditto, except with air motor agitator, $70.00.

1 Binks "T", 30-gals. Ditto, double outlet, with hand operated agitator, $89.60.

1 Binks "T", 30-gals. Ditto, except with air motor agitator, $120.00.

1 Paasche, 120-gals. 30-in. diam. 3-ft. 6-in. high, sound deadener tank, $90.00.

3 Paasche, 60-gal. 200-lb. W. P. sound deadener tank, $65.00.

1 large lot of Miscellaneous spray guns, including Binks, DeVilbiss, and 2 Paasche Sound Deadener guns. Prices approximately one-half the new price.

All prices quoted F.O.B. Indianapolis, Indiana, and subject to prior sale.

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Indianapolis, Indiana

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